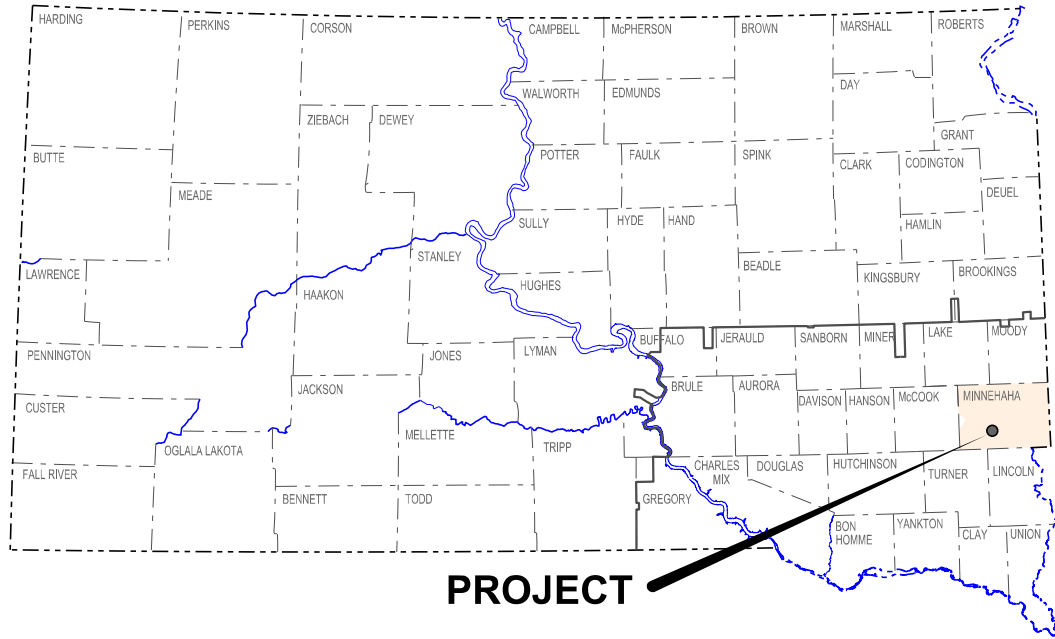


PLOT SCALE - 1"=7000'



PROJECT

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED
PROJECT 090E-288
INTERSTATE 90 EBL
MINNEHAHA COUNTY

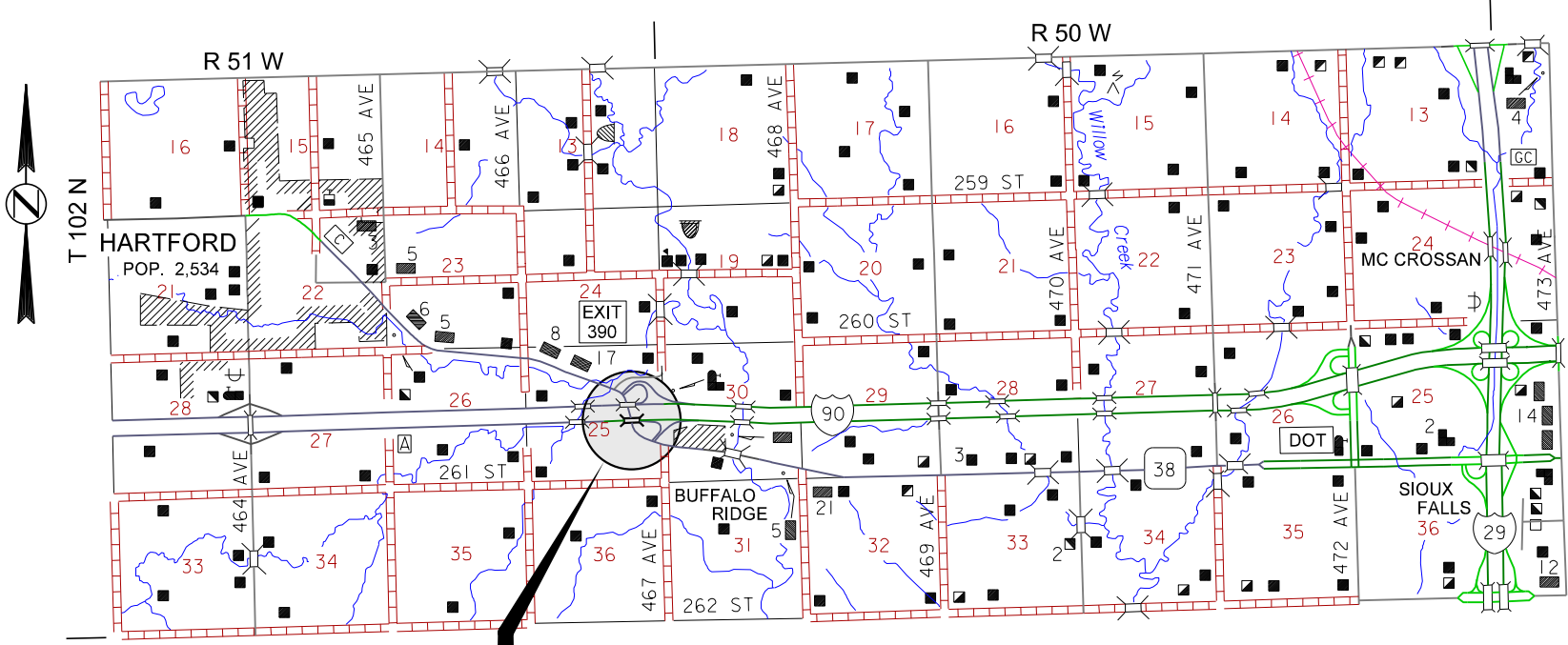
DETOUR SIGNING, TEMPORARY SIGNALS, TEMPORARY BARRIERS,
BRIDGE REPAIR (OVERHEIGHT HIT)
PARTIAL DECK & RAIL REPLACEMENT,
GIRDER REPLACEMENT, GIRDER REPAIR &
CROSSOVER REMOVAL
PCN I6WT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 E-288	1	48

Plotting Date: 10/27/2022

INDEX OF SHEETS

Sheet 1	Layout Map & Index of Sheets
Sheet 2	Estimate of Quantities
Sheet 3	Environmental Commitments
Sheets 4 - 8	Traffic Control
Sheets 9 - 12	Barrier Layouts
Sheets 13 - 15	Detour Route
Sheets 16 & 17	Crossover Removal & Erosion Control
Sheets 18 - 40	Bridge Repair at Structure 50-119-166
Sheets 41 - 48	Standard Plates



STRUCTURE 50-119-166
Prestressed Girder Bridge
239'-3 1/16"=0.045 Mile
MRM 390.28 EBL

DESIGN DESIGNATION		
PROJECT	I90E	SD38
ADT(2021)	7,610	4,197
ADT(2041)	11,453	6,500
DHV	1,569	874
D	50%	50%
T DHV	8.6%	1.9%
T ADT	18.8%	4.2%
V	80 MPH	65 MPH

STORM WATER PERMIT
(None required)

PLOTTED FROM - TRM11NT15

FILE - ...\\MINN16WT\\TITLE16WT.DGN PLOT NAME - 1

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E0655	Remove Interim Crossover Closure	140	Ft
250E0020	Incidental Work, Grading	Lump Sum	LS
450E4759	18" CMP 16 Gauge, Furnish	70	Ft
450E4760	18" CMP, Install	70	Ft
450E5405	18" CMP Safety End with Bars, Furnish	1	Each
450E5407	18" CMP Safety End, Install	1	Each
634E0010	Flagging	100.0	Hour
634E0110	Traffic Control Signs	2,064.1	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0275	Type 3 Barricade	7	Each
634E0310	Temporary Flexible Vertical Markers (Tabs)	3,300	Ft
634E0330	Temporary Raised Pavement Markers	6,000	Ft
634E0380	Tubular Marker	68	Each
634E0390	Replace Tubular Marker	6	Each
634E0420	Type C Advance Warning Arrow Board	2	Each
634E0525	Linear Delineation System Panel, Barrier Mounted	6	Each
634E0600	4" Temporary Pavement Marking Tape Type I	144	Ft
634E0700	Traffic Control Movable Concrete Barrier	81	Each
634E0750	Temporary Concrete Barrier End Protection	3	Each
634E0760	Temporary Concrete Barrier End Protection Module Set or Repair Kit	1	Each
634E0900	Portable Temporary Traffic Control Signal	2	Unit
634E1002	Detour and Restriction Signing	550.9	SqFt
634E1150	Opposing Traffic Lane Divider	10	Each
634E1215	Contractor Furnished Portable Changeable Message Sign	2	Each
734E0010	Erosion Control	Lump Sum	LS

STRUCTURE 50-119-166

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
110E0040	Remove Concrete Bridge Slab	201.0	SqYd
460E0010	Class A45 Concrete, Bridge Barrier	9.0	CuYd
460E0030	Class A45 Concrete, Bridge Deck	57.6	CuYd
460E0190	Concrete Crack Injection/Sealing	360	In
460E0300	Breakout Structural Concrete	11.5	CuYd
460E0500	Deck Drain, Girder Bridge	2	Each
460E0600	Housing and Heating Concrete	66.6	CuYd
460E0650	Roadway Canopy	Lump Sum	LS
480E0100	Reinforcing Steel	457	Lb
480E0200	Epoxy Coated Reinforcing Steel	13,004	Lb
480E0505	No. 5 Rebar Splice	18	Each
480E0506	No. 6 Rebar Splice	18	Each
480E5000	Galvanic Anode	105	Each
491E0005	Two Coat Bridge Deck Polymer Chip Seal	185.1	SqYd
491E0110	Abrasive Blasting of Bridge Deck	185.1	SqYd
491E0120	Bridge Deck Grinding	185.1	SqYd
560E8067	63" Minnesota Shape Prestressed Concrete Beam, Install	203	Ft
560E9503	Prestressed Concrete Beam Repair	Lump Sum	LS

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition
and Required Provisions, Supplemental Specifications and
Special Provisions as included in the Proposal.

ENVIRONMENTAL COMMITMENTS

The SDDOT is committed to protecting the environment and uses Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be

the Project Engineer. During construction, the Project Engineer will verify that the Contractor has met Environmental Commitment requirements. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: <<https://dot.sd.gov/media/documents/EnvironmentalProceduresManual.pdf> >

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Engineer at 605-773-3180 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

Once construction is complete, the Project Engineer will review all environmental commitments for the project and document their completion.

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

Construction activities constitute 1 acre or more of earth disturbance and/or work in a waterway.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor will furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

The waste disposal site(s) will be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) will not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Environmental Office and the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements will apply:

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials will be buried in a trench separate from wood debris. The final cover over the construction and/or demolition debris will consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW will be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor will control the access to waste disposal sites not within the Public ROW with fences, gates, and placement of a sign or signs at the entrance to the site stating, "No Dumping Allowed".

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period not to exceed the duration of the project. Prior to project completion, the waste will be removed from view of the ROW or buried, and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06. Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) will be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

State Historic Preservation Office (SHPO or THPO) concurrence has not been obtained for this project.

Action Taken/Required:

All earth disturbing activities not designated within the plans require a cultural resource review prior to scheduling the pre-construction meeting. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor will arrange and pay for a record search and when necessary, a cultural resource survey. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review if the site was previously surveyed; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor will provide ARC with the following: a topographical map or aerial view of which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor will submit the cultural resources survey report to SDDOT Environmental Office, 700 East Broadway Avenue, Pierre, SD 57501-2586. SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

In the event of an inadvertent discovery of human remains, funerary objects, or if evidence of cultural resources is identified during project construction activities, then such activities will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office to determine an appropriate course of action.

The Contractor is responsible for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor will not utilize a site known or suspected of having contaminated soil or water. The Contractor will provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

SEQUENCE OF OPERATIONS

Contractor requests to deviate from the sequence of operations will be submitted in writing to the Engineer for review. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department’s intent for traffic control and sequencing of the work. An alternate sequence will be submitted for review a minimum of one week prior to potential implementation.

COORDINATION BETWEEN CONTRACTORS

A separate contract for Project IM002285 - PCN 089K has been awarded to another Contractor for concrete repair near Buffalo Ridge.

A separate contract for Project IM 0022(94) - PCN 08Y8 has been awarded to another Contractor for milling and asphalt resurfacing of shoulders.

A separate contract for Project IM-EM 0908(97)362 - PCN 05T3 has been awarded to another Contractor for remove and replace PCC surfacing, replace bridge, and approach grading.

The Contractor will schedule work as to not to interfere or hinder the progress of work for the Contractors for the projects listed above.

GENERAL TRAFFIC CONTROL

Existing guide, route, informational logo, regulatory, and warning signs will be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging, and resetting of existing traffic control devices, including delineation, will be the responsibility of the Contractor. Cost for this work will be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost will be replaced by the Contractor at no cost to the State.

All temporary traffic control sign locations will be set in the field by the Contractor and verified by the Engineer prior to installation.

All temporary speed limit signs will have a minimum mounting height of 5 feet in rural locations, even when mounted on portable supports.

All construction operations will be conducted in the general direction of traffic movement.

If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD, whichever is more stringent will be used, as determined by the Engineer.

Unless otherwise stated in these plans, work will not be allowed during hours of darkness.

Fixed location signing placed more than 4 calendar days prior to the start of construction will be covered or laid down until the time of construction. The covers must be approved by the Engineer prior to installation. The cost of materials, labor, and equipment necessary to complete this work will be incidental to other contract items. No separate payment will be made.

GENERAL TRAFFIC CONTROL (CONTINUED)

All fixed location signs, sign posts, and breakaway bases will be removed within 7 calendar days following pavement marking.

All haul trucks will be equipped with an additional flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights will be incidental to the various related contract items.

Traffic will be maintained on the driving lanes. Use of the shoulder as a driving lane will not be permitted. Any damage to the shoulder due to rerouted traffic or Contractor’s equipment will be repaired at no expense to the Department.

Construction vehicles will exit or enter the construction work zone at locations identified by the Engineer. At no time will construction vehicles utilize the maintenance crossovers or the Interstate median to exit or enter Interstate traffic.

Channelizing devices in a series will be of the same type. Channelizing drums shall be of a two-part construction with breakaway bases. The Contractor may use 42" Grabber Cones for longitudinal delineation only. All tapers and lane transitions will be accomplished utilizing drums in accordance with the MUTCD. All channelizing devices will be incidental to the contract price for Traffic Control, Miscellaneous.

Eastbound traffic will not get crossed over to head-to-head traffic long term until the Contractor is ready to pour the bridge deck as approved by the Engineer. To limit the amount of time traffic is crossed over, once the bridge is poured, the girder repair and barrier wall must proceed immediately subsequent as allowed by specifications.

Traffic may be crossed over during daylight hours with opposing lane dividers instead of the tubular markers and raised pavement markers during the process of setting girders. If Opposing Traffic Lane Dividers are used, each divider will be installed at 400 foot intervals. In conjunction with the Opposing Traffic Lane Dividers, the Contractor will install 42 inch tall reflectorized cones at 50 foot intervals.

WORK ZONE SPEED REDUCTION

The Department is required to obtain a speed reduction resolution prior to the installation of any SPEED LIMIT (R2-1) signs shown on standard plate 634.63. To provide adequate time for the resolution to be enacted, the Contractor will inform the Engineer a minimum of 3 weeks prior to the scheduled installation of any work zone speed reduction signs on the project. The information provided by the Contractor will include the anticipated date of sign installation, the newly reduced speed limit, the location of the work zone, and the anticipated completion date of work requiring the speed reduction.

CONTACTOR FURNISHED PORTABLE CHANGEABLE MESSAGE SIGN

One week prior to starting work affecting the traveling public, portable changeable message signs (PCMS) will be installed at locations detailed in the plans to notify drivers of the upcoming construction. The Contractor will program the portable changeable message signs with the following message:

ROAD WORK
STARTS
DATE

When work begins that will affect traffic patterns, the Contractor will re-program the PCMS with the messages as detailed below:

ONE LANE
AHEAD

REDUCE
SPEED

TEMPORARY RAISED PAVEMENT MARKERS

Temporary raised pavement markers will be used for marking edge lines, lane lines, and centerlines. Temporary raised pavement markers will be used on all new permanent surfacing sections of roadway and on existing surfacing where temporary marking locations are different than existing marking locations, unless noted or as directed by the Engineer.

Temporary raised pavement markers will be attached to the roadway surface with a flexible non-permanent bituminous adhesive capable of being removed from the roadway surface or with an adhesive approved by the Engineer.

All costs to furnish, install, replace if necessary, and remove the markers will be incidental to the contract unit price per foot or mile for “Temporary Raised Pavement Markers”.

LOCATION	MARKERS (FT)
HEAD-TO-HEAD ON I-90	4,400
EB I-90 LANE CLOSURE	1,600
TOTAL	6,000

TEMPORARY FLEXIBLE VERTICAL MARKERS (TABS)

Temporary pavement marking for SD 38 centerline and tapers for work space will consist of temporary flexible vertical markers (tabs) depicted on standard plate 634.26.

LOCATION	TABS (FT)
SD 38 LANE CLOSURE	2,400
SD 38 LANE CLOSURE	900
TOTAL	3,300

BARRIER MOUNTED LINEAR DELINEATION SYSTEM PANELS

A linear delineation system (LDS) panel will be attached to each barrier section. The color will be the same as the nearest pavement marking, white along outside edgelines or yellow for the left side on one way traffic sections. The LDS will be 34 inches long and 6 inches in height and be constructed of aluminum formed into a shape to provide retroreflective properties across a wide range of angles. It will be sheeted with sheeting meeting the requirements of ASTM D4956 Type XI. The panels will be evenly spaced, with the top of the panel 4 inches below the top of the barrier. Installation will be as per the manufacturer’s recommendations. This will allow for easy removal for replacement of damaged panels or to replace with an alternate color. The Contractor will furnish and install one panel along each side of the barrier if any panels are missing from the barriers. Replacement of damaged linear delineation system panels will be furnished and replaced by the Contractor. All costs associated with furnishing, installing, and replacing, if needed, will be incidental to the contract unit price per each for Linear Delineation System Panel, Barrier Mounted.

All LDS panels will remain attached to the barrier sections and will become the property of the State of South Dakota upon completion of the project.

The Contractor will verify the number of LDS panels that will need to be installed or replaced on the Traffic Control Movable Concrete Barriers. The contract amount of LDS panels is an estimate and the full contract amount may not be needed.

Maintaining the linear delineation system, including moving LDS panels from one side of the barrier to the other side of the barrier to match the applicable color of the nearest pavement marking will be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

TUBULAR MARKERS

The color of the tubular markers on centerline will be predominately orange. The color of the tubular markers installed on the shoulders will be predominately white. The white tubular markers will be installed 2.0 feet from the existing edge line at intervals of approximately 480 feet.

All tubular markers will be a minimum of 28 inches in height. The base of the tubular marker should be attached to the roadway surface with a flexible non-permanent bituminous adhesive capable of being removed from the roadway surface after use. The pin used to connect the marker to the base will be of a type that will not puncture a vehicle tire if it should become dislodged from the base.

All costs for furnishing, installing, maintaining, and removing the tubular markers will be incidental to the contract unit price per each for “Tubular Marker”.

LOCATION	MARKERS (EACH)
HEAD-TO-HEAD ON I-90	50
HEAD-TO-HEAD ON I-90	18
TOTAL	68

DETOUR SIGNING

The Contractor will furnish and install detour signs as shown in these plans. Prior to installing the signs, the Contractor will mark the sign locations and review them with the Engineer. Detour signs will be installed on fixed location, ground mounted, breakaway supports. It will be the responsibility of the Contractor to maintain and reinstall these signs during the project as required by the construction progress. Upon completion of the project, the Contractor will remove the detour signs.

All costs for furnishing the signs, posts, and mounting hardware, and for installing, maintaining, covering, and removing the detour signs will be incidental to the contract unit price per square foot for “Detour and Restriction Signing”.

INCIDENTS

An incident is an emergency road user occurrence, a natural disaster, or other unplanned event that affects or impedes the normal flow of traffic such as a crash, hazardous materials spill, or other event.

The Contractor will set up a meeting prior to start of work to plan and coordinate responses to an incident. The Contractor will invite the Department of

Transportation, the South Dakota Highway Patrol, the Minnehaha County Sheriff and local emergency response entities to the meeting.

The Contractor will assist to maintain traffic as required by these plan notes and as agreed to at that meeting.

Emergency vehicle access through the project will be considered and discussed at the meeting.

The Contractor may be required to modify messages on portable changeable message signs or relocate portable changeable message signs, and to provide flaggers to direct or detour traffic. The Contractor should be prepared to relocate advance warning signs if determined to be necessary for a major traffic incident lasting more than two hours. Fixed location ground mounted signs may be covered and additional portable signs provided.

No additional payment will be made for the modification of portable changeable message sign messages or the relocation of portable changeable message signs. Cost for the relocation of an advance warning sign due to an incident will be 50% of the designated sign rate. Flaggers will be paid for at the contract unit price per hour for “Flagging”.

PRESS RELEASE ANNOUNCEMENTS

The SDDOT will prepare a press release to be released 5 days prior to any phase change or any other major change that affects traffic flow. The SDDOT will be responsible to keep law enforcement, emergency services, and the traveling public notified of changes in project access. The Contractor will provide the Engineer with pertinent information 7 days prior to any phase change or any other major change that affects traffic flow.

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS ON SD 38 LANE CLOSURE

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD			
		NUM BER	SIGN SIZE	SQFT PER SIGN	SQFT
R10-6	STOP HERE ON RED	2	24" x 36"	6.0	12.0
W1-4	REVERSE CURVE (L or R)	1	48" x 48"	16.0	16.0
W3-3	SIGNAL AHEAD (symbol)	2	48" x 48"	16.0	32.0
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK	2	36" x 18"	4.5	9.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS ON I-90 EB CLOSURE

SIGN CODE	SIGN DESCRIPTION	EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R2-1	SPEED LIMIT 45	8	36" x 48"	12.0	96.0
R2-1	SPEED LIMIT 65	12	36" x 48"	12.0	144.0
R2-1	SPEED LIMIT 80	4	36" x 48"	12.0	48.0
R2-6aP	FINES DOUBLE (plaque)	4	36" x 24"	6.0	24.0
W3-5	SPEED REDUCTION AHEAD (45 MPH)	4	48" x 48"	16.0	64.0
W3-5	SPEED REDUCTION AHEAD (65 MPH)	8	48" x 48"	16.0	128.0
W4-2	LEFT or RIGHT LANE ENDS (symbol)	16	48" x 48"	16.0	256.0
W20-1	ROAD WORK AHEAD	8	48" x 48"	16.0	128.0
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	8	48" x 48"	16.0	128.0
W20-7	FLAGGER (symbol)	4	48" x 48"	16.0	64.0
G20-2	END ROAD WORK	4	48" x 24"	8.0	32.0
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT			

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS ON I-90 HEAD-TO-HEAD

SIGN CODE	SIGN DESCRIPTION	EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R2-1	SPEED LIMIT 65	4	36" x 48"	12.0	48.0
R2-1	SPEED LIMIT 80	2	36" x 48"	12.0	24.0
R2-6aP	FINES DOUBLE (plaque)	8	36" x 24"	6.0	48.0
R4-1	DO NOT PASS	2	36" x 48"	12.0	24.0
R4-7	KEEP RIGHT (symbol)	1	36" x 48"	12.0	12.0
R5-1	DO NOT ENTER	1	36" x 36"	9.0	9.0
R11-2	ROAD CLOSED	1	48" x 30"	10.0	10.0
W1-3	REVERSE TURN (L or R)	3	48" x 48"	16.0	48.0
W1-6	LARGE ARROW (one direction)	2	60" x 30"	12.5	25.0
W3-5	SPEED REDUCTION AHEAD (65 MPH)	4	48" x 48"	16.0	64.0
W4-1	MERGE (symbol)	4	48" x 48"	16.0	64.0
W4-2	LEFT or RIGHT LANE ENDS (symbol)	8	48" x 48"	16.0	128.0
W6-3	TWO WAY TRAFFIC (symbol)	2	48" x 48"	16.0	32.0
W7-3aP	NEXT __ MILES (plaque)	2	36" x 30"	7.5	15.0
W13-1P	ADVISORY SPEED (plaque)	3	30" x 30"	6.3	18.9
W20-1	ROAD WORK AHEAD	4	48" x 48"	16.0	64.0
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	4	48" x 48"	16.0	64.0
W20-7	LEFT or RIGHT LANE CLOSED 1/2 MILE	4	48" x 49"	16.3	65.2
SPECIAL	CLOSED	2	60" x 48"	20.0	40.0
G20-2	END ROAD WORK	2	48" x 24"	8.0	16.0
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT			
		819.1			

ITEMIZED LIST FOR SD 38 DETOUR ROUTE

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD				EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W20-2	DETOUR AHEAD	4	48" x 48"	16.0	64.0	2	48" x 48"	16.0	32.0
M1-5	SD 38 ROUTE MARKER (2 digits)	23	24" x 24"	4.0	92.0	9	36" x 36"	9.0	81.0
M3-2	DIRECTION MARKER - EAST	16	24" x 12"	2.0	32.0	4	36" x 18"	4.5	18.0
M3-4	DIRECTION MARKER - WEST	7	24" x 12"	2.0	14.0	5	36" x 18"	4.5	22.5
M4-5	TO	17	24" x 12"	2.0	34.0	7	36" x 18"	4.5	31.5
M4-8	DETOUR	17	24" x 12"	2.0	34.0	7	30" x 15"	3.1	21.7
M4-8a	END DETOUR	2	24" x 18"	3.0	6.0		36" x 24"	6.0	
M5-1	ADVANCE TURN ARROW 90° (L or R)	6	21" x 15"	2.2	13.2	1	30" x 21"	4.4	4.4
M5-2	ADVANCE TURN ARROW 45° (L or R)		21" x 15"	2.2		2	30" x 21"	4.4	8.8
M6-1	DIRECTION ARROW - Horizontal Single Head (L or R)	8	21" x 15"	2.2	17.6		30" x 21"	4.4	
M6-2	DIRECTION ARROW - 45° Single Head (L or R)		21" x 15"	2.2		2	30" x 21"	4.4	8.8
M6-3	DIRECTION ARROW - Vertical Single Head	3	21" x 15"	2.2	6.6	2	30" x 21"	4.4	8.8
		CONVENTIONAL ROAD DETOUR AND RESTRICTION SIGNING SQFT				EXPRESSWAY / INTERSTATE DETOUR AND RESTRICTION SIGNING SQFT			
		313.4				237.5			

BARRIER LAYOUT FOR LANE CLOSURE ON I90 EB



BARRIER LAYOUT FOR HEAD-TO-HEAD ON I-90



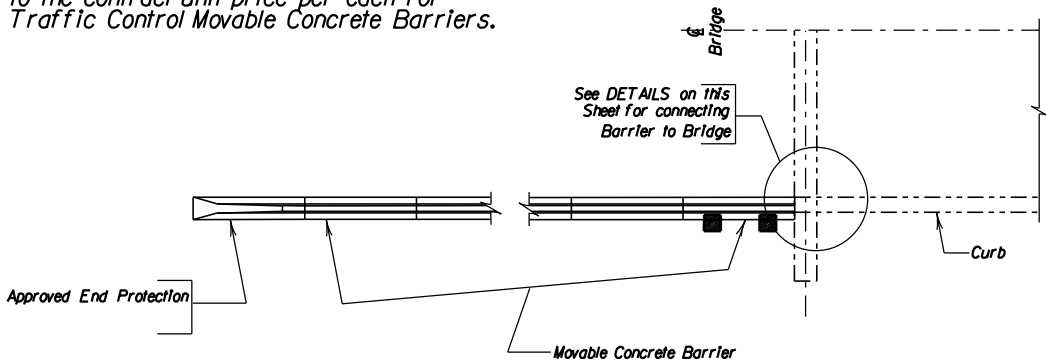
The Contractor will ensure the entire width of the Barriers are installed on a level surface. All miscellaneous hardware including but not limited to post, block, cable, pins, steel beam guardrail and delineators shall be incidental to the contract unit price per each for Traffic Control Movable Concrete Barriers.

ATTACHMENT OF MOVABLE CONCRETE BARRIERS TO BRIDGE ENDS

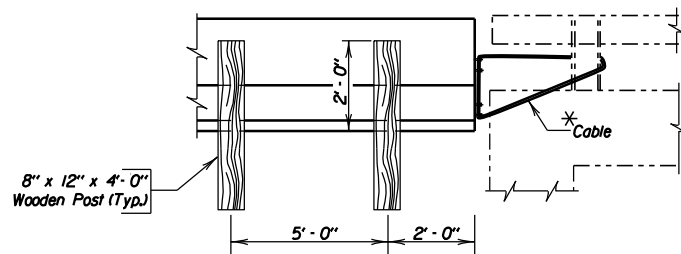
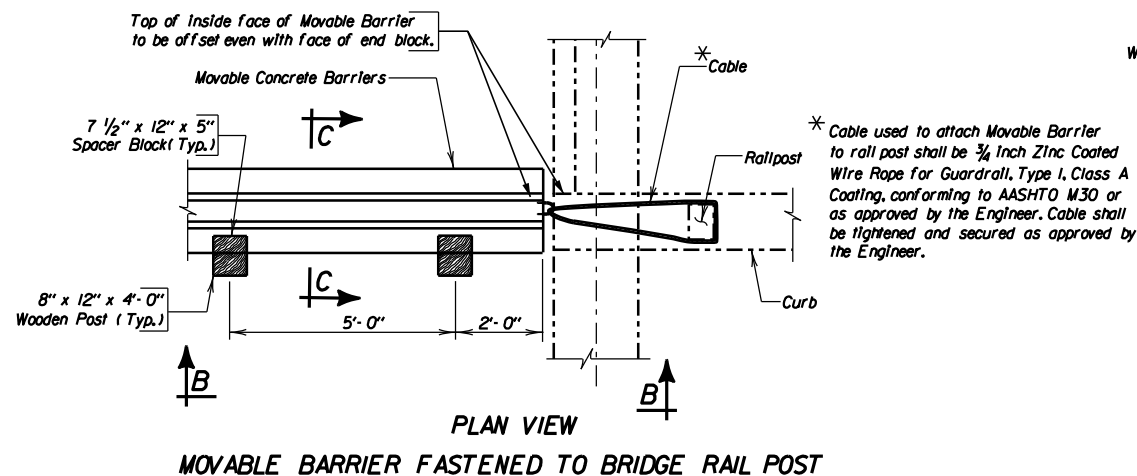
STATE OF SOUTH DAKOTA	PROJECT 090 E-288	SHEET 11	TOTAL SHEETS 48
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Plotting Date: 10/27/2022

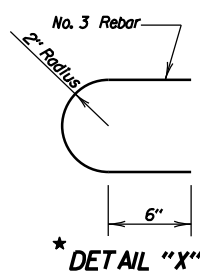
Revised: 1Aug22, RML



LAYOUT OF MOVABLE CONCRETE BARRIER AT BRIDGE ENDS

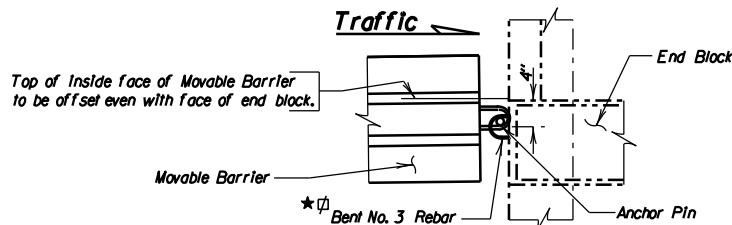


VIEW B - B



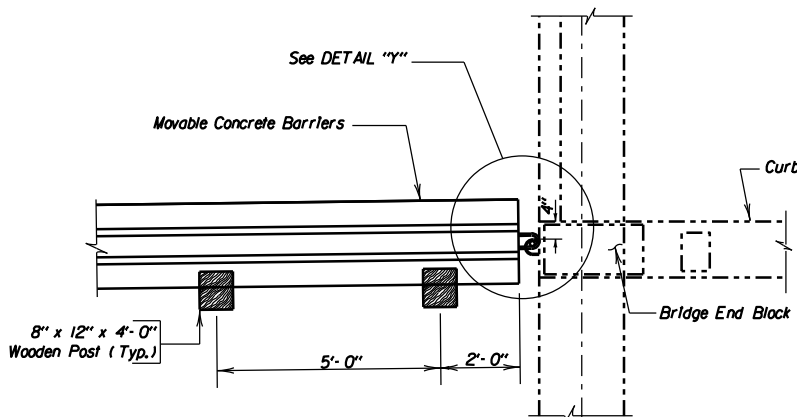
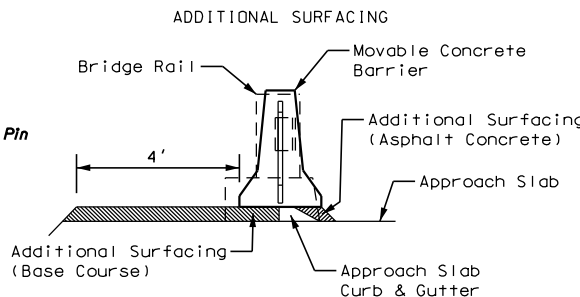
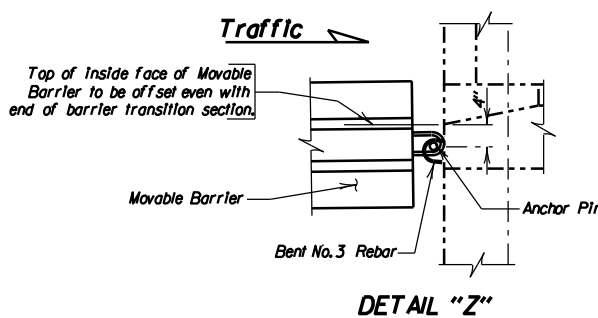
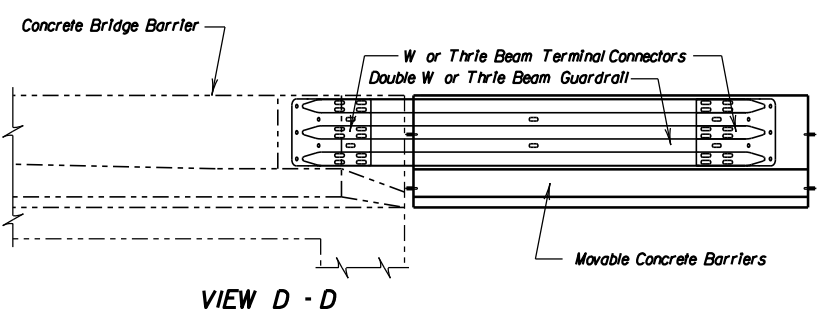
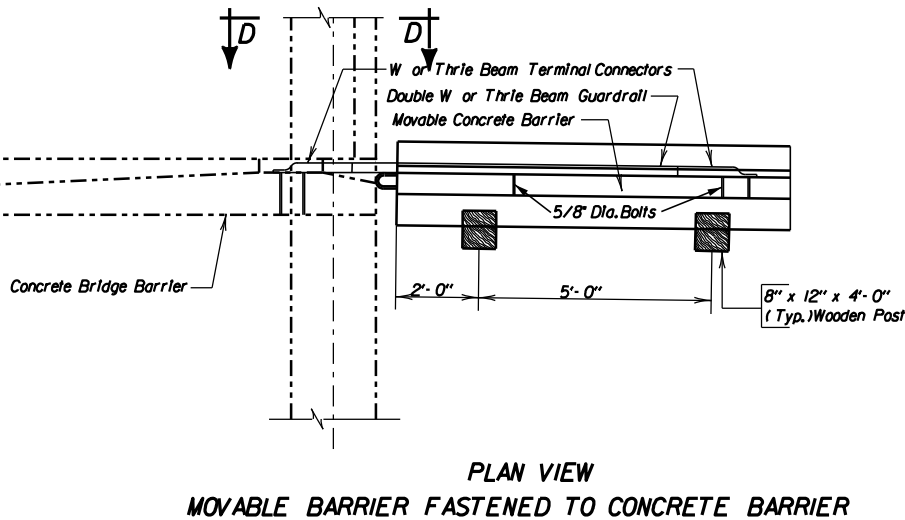
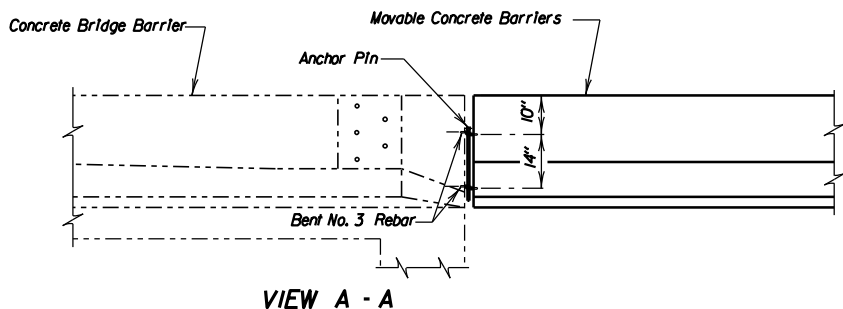
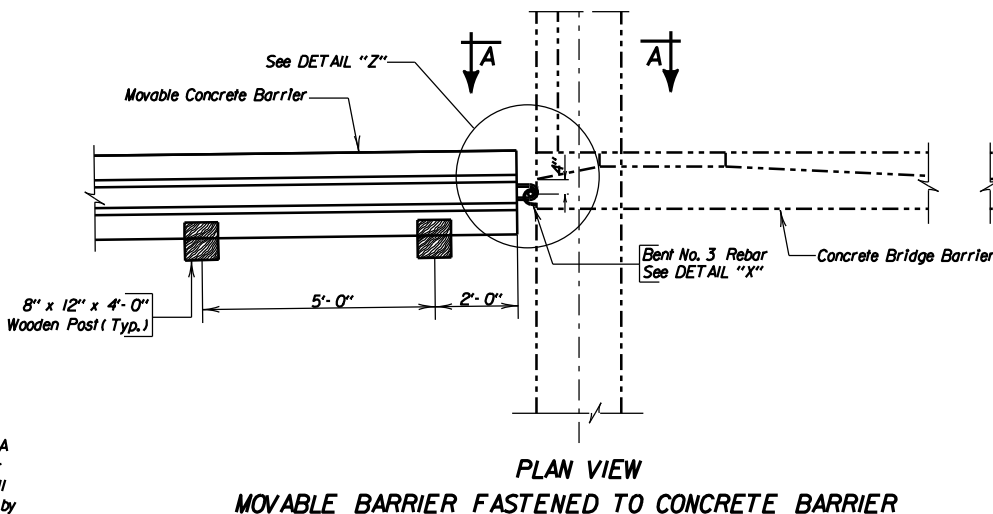
* Drill In and epoxy No. 3 Rebar. See notes under "Installing Dowels in Concrete". Minimum Embedment of 4".

PLAN VIEW
MOVABLE BARRIER FASTENED TO BRIDGE END BLOCK



Use same spacing as shown in VIEW A - A.

DETAIL "Y"



PLOT SCALE - 1:33

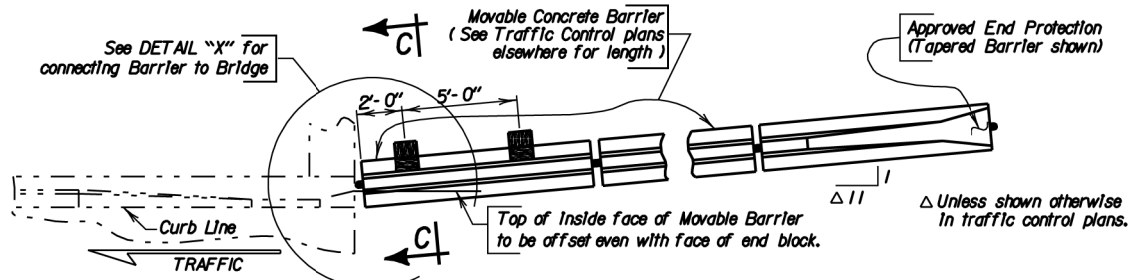
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PLOT NAME - 1

FILE - ... \GUARDRAIL MOVABLE BARRIERS.DGN

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	12	48

Plotting Date: 01/04/2021



LAYOUT OF MOVABLE CONCRETE BARRIER AT BRIDGE ENDS

GENERAL CONSTRUCTION

1. Length and number of barrier sections to be used is shown in the traffic control plans.
2. Place movable barriers as close to the end of bridge barrier as possible.
3. Wire rope for attaching movable barrier to bridge end shall have a minimum breaking strength of 20,000 lbs. Wire rope shall be tightened and secured with 3 (Three) clamps as approved by the Engineer.
4. For end block configurations not shown, contact the Office of Bridge Design, through proper channels, for connection details.
5. Include all costs for making the temporary connection including, wire rope, hardware, epoxy resin, rebar, installation and any other incidental items in the unit price bid for Traffic Control Movable Concrete Barrier.

INSTALLING DOWELS IN CONCRETE

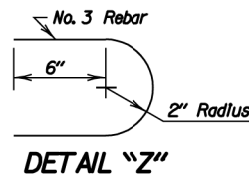
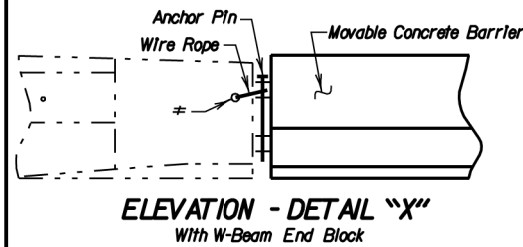
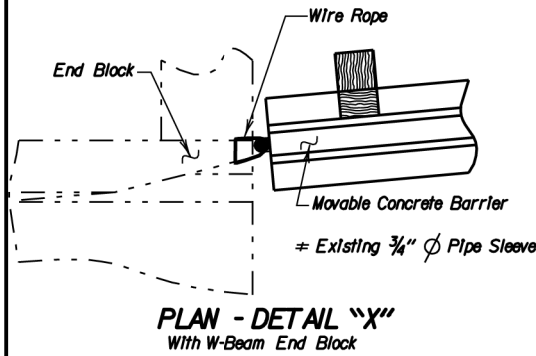
1. Where existing end block configuration allows, rebar as shown in DETAIL "Z" shall be attached to the end block by drilling and epoxying. Holes drilled in the existing concrete shall be true and normal or as shown in the plans. Prior to the start of drilling any holes in the concrete, an effort will be made by Department forces to mark on the concrete surface where practical any locations of the in-place reinforcing steel. In spite of this precaution, the Contractor can still expect to encounter and have to drill through reinforcing steel.
2. The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).
3. The diameter of the drilled holes shall not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. Use compressed air or other techniques to ensure that the hole is free of any loose material before epoxy resin is applied.
4. Mix epoxy resin as recommended by the Manufacturer and apply by an Injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel bar. Use epoxy resin intended for horizontal dowel installation. Care shall be taken to prevent epoxy from running out of the horizontal holes prior to steel bar insertion. Installation shall be such that voids are eliminated and complete bonding of the bar assured. Insertion of the bars by the dipping method will not be allowed.
5. No loads shall be applied to the epoxy grouted bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.

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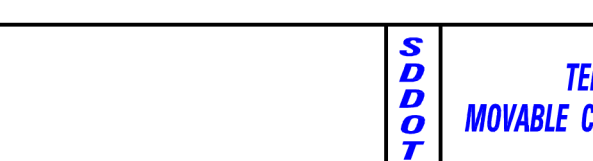
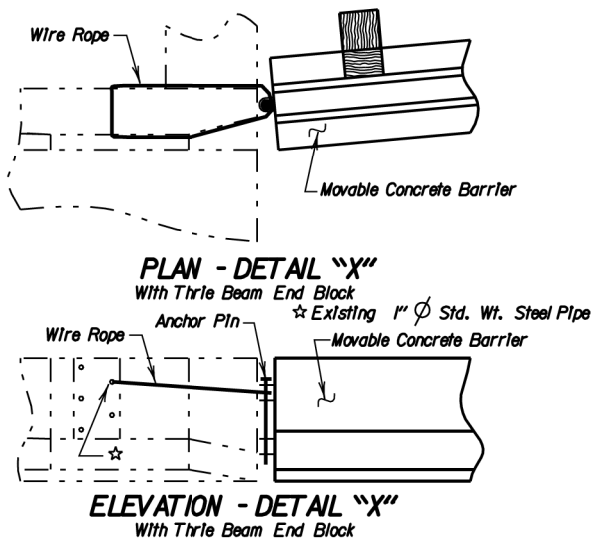
TEMPORARY CONNECTION OF
MOVABLE CONCRETE BARRIER TO BRIDGE END

PLATE NUMBER
SPECIAL

Sheet 1 of 2



NOTE:
Drill in and epoxy No. 3 Rebar.
See notes for "Installing Dowels
in Concrete". Min. Embedment = 4"

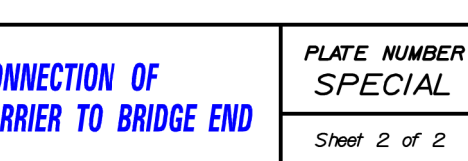
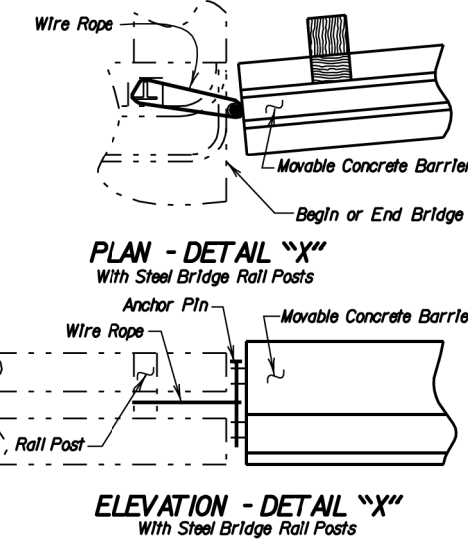
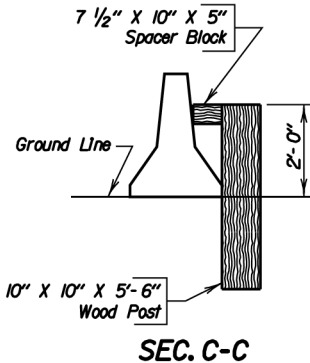
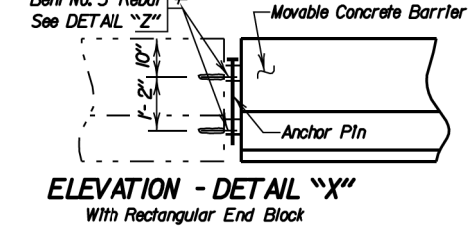
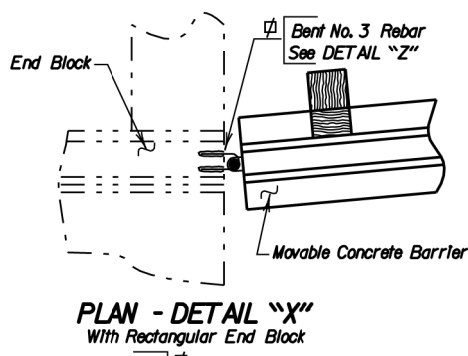


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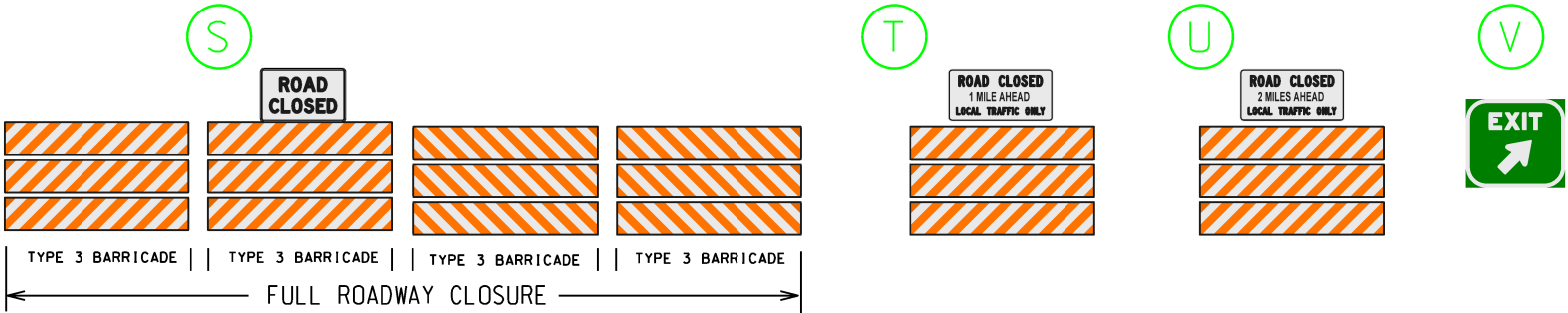
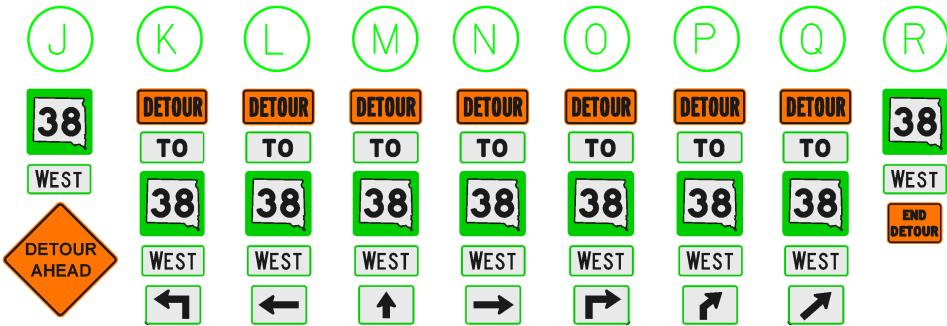
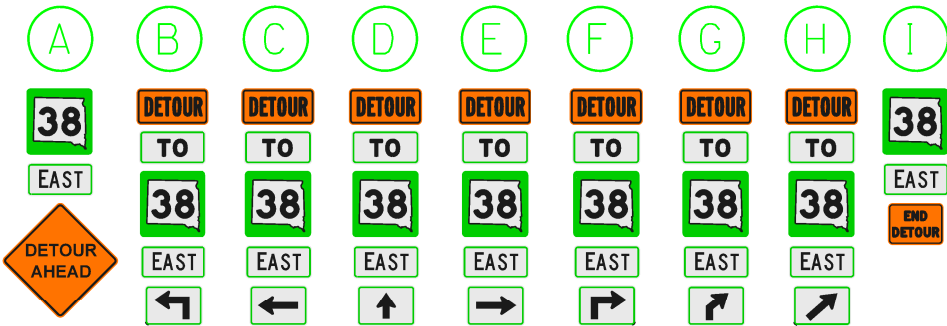
TEMPORARY CONNECTION OF
MOVABLE CONCRETE BARRIER TO BRIDGE END

PLATE NUMBER
SPECIAL

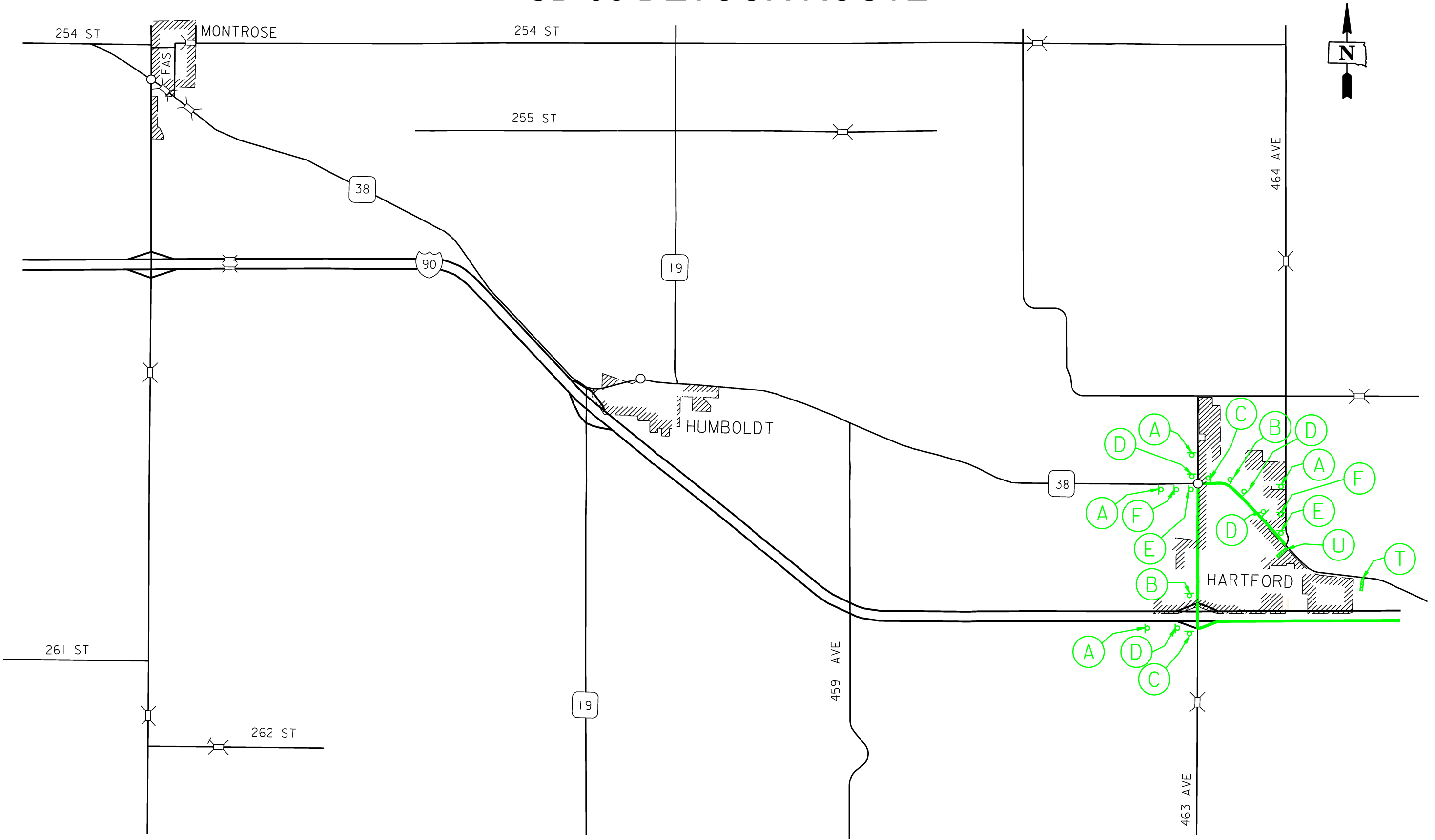
Sheet 2 of 2



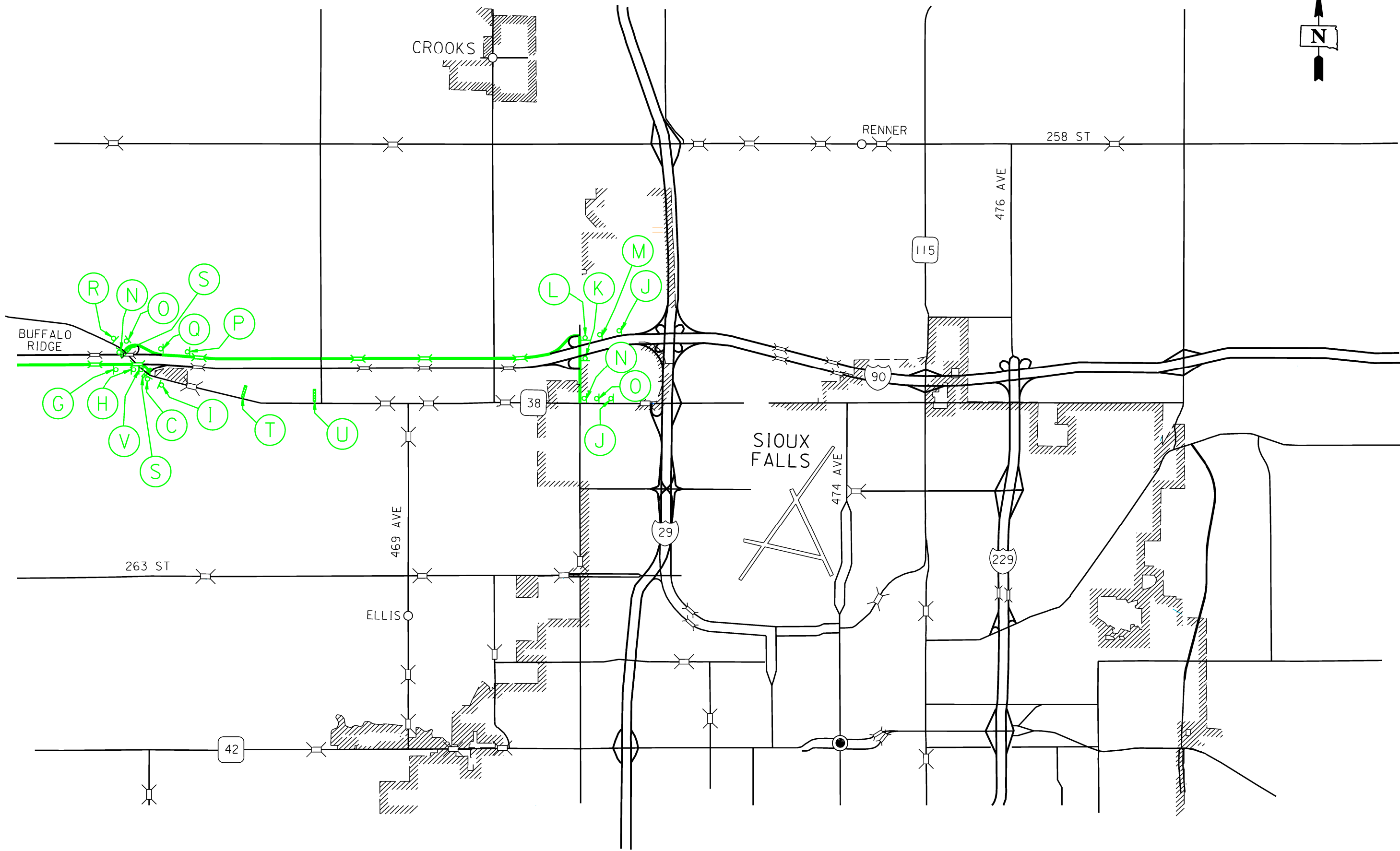
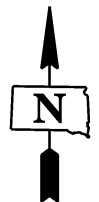
SD 38 DETOUR ROUTE



SD 38 DETOUR ROUTE



SD 38 DETOUR ROUTE



INCIDENTAL WORK, GRADING

A temporary traffic crossover will be used for two-way traffic on I90 WB. Once the bridge work has been completed, this temporary crossover will be removed, and a new maintenance crossover will be constructed in the same location. Incidental Work, Grading includes removal of the in-place asphalt crossover and construction of the new maintenance crossover. The new maintenance crossover will be constructed using salvaged pit run and base course materials from the in-place crossover. It is anticipated there will be 400 CuYd's of excess materials that will need to be disposed by the Contractor as waste. Inslopes will also need to be reshaped to match the existing interstate cross-section. All equipment, labor, and tools necessary for compaction and excavation of material, sawing and removal of asphalt, removal and replacement of 4" of topsoil, and disposal of waste to complete this work will incidental to the contract unit price for Incidental Work, Grading.

Remove and Replace Topsoil

Topsoil will be salvaged and stockpiled prior to constructing the ramp detour. Limits of this work, depth of salvage, and stockpile location will be directed by the Engineer. Following completion of construction, topsoil will be spread evenly over the disturbed areas and inslopes of the ramp detour. Minor shaping may be required for proper drainage to the existing pipe under the current ramp.

The estimated amount of topsoil to be removed and replaced is 100 CuYd. All costs associated with removing and replacing the topsoil along areas to be resurfaced will be incidental to the contract lump sum price for "Incidental Work, Grading".

LOCATION	TOPSOIL (CUYD)
WEST CROSSOVER ON I-90	100
TOTAL	100

EROSION CONTROL

The estimated area requiring erosion control is 7500 square feet (0.17 Acres). All costs for the erosion control work for furnishing, placing, and maintaining erosion control including equipment, labor, seeding, fertilizing, mulching, waddles, and silt fence will be incidental to the contract lump sum price for "Erosion Control".

The limits of erosion control work will be determined by the Engineer during construction.

Permanent Seeding

Type G Permanent Seed Mixture will consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Arriba, Flintlock, Rodan, Rosana, Walsh	7
Switchgrass	Dacotah, Forestburg, Nebraska 28, Pathfinder, Summer, Sunburst, Trailblazer	3
Indiangrass	Holt, Tomahawk, Chief, Nebraska 54	3
Big Bluestem	Bison, Bonilla, Champ, Sunnyview, Rountree, Bonanza	3
Oats or Spring Wheat: April through May; Winter Wheat: August through November		10
Total:		26

Fertilizing

The Contractor will apply an all-natural slow release fertilizer prior to seeding or placing sod. The all-natural fertilizer will have a minimum guaranteed analysis of 4-4-4 and be USDA Certified BioBased. It should provide a minimum of 4% (N) nitrogen with a minimum water insoluble nitrogen (WIN) fraction of 2.07%, a minimum of 4% (P2O5) available phosphate, a minimum of 4% (K2O) soluble potash, and a maximum carbon to nitrogen ratio (C:N ratio) of 5:1. The all-natural fertilizer will be free of weed-seed and pathogens accomplished through thermophilic composting, and not mechanical or chemical sterilization, to assure presence of beneficial soil microbiology. The fertilizer will have a near neutral pH, a low salt index, a low biological oxygen demand, contain organic humic and fulvic acids, and have high aerobic organism counts. The fertilizer will also be stable, free of bad odors, and be unattractive as a food source for animals. It should also be in a granular form that is easily spread.

The fertilizer will be applied at a rate of 1,500 pounds per acre in accordance with the manufacturer's recommended method of application.

The all-natural slow release fertilizer will be as shown below or an approved equal:

Product	Manufacturer
Sustane	Sustane Corporate Headquarters Cannon Falls, Minnesota Phone: 1-800-352-9245 www.sustane.com
Perfect Blend	Perfect Blend, LLC Bellevue, WA Phone: 1-866-456-8890 www.perfect-blend.com

Mycorrhizal Inoculum

Mycorrhizal inoculum will consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier will provide certification of the fungal species claimed and the live propagule count. The inoculum will include a minimum 25% the fungal species *Rhizophagus intraradices*. The remaining 75% may include other endomycorrhizal fungal species.

All seed will be inoculated by the seed supplier with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed will be incidental to the contract unit lump sum price for "Erosion Control".

The mycorrhizal inoculum will be as shown below or an approved equal:

Product	Manufacturer
MycoApply	Mycorrhizal Applications, Inc. Grants Pass, OR Phone: 1-866-476-7800 www.mycorrhizae.com
AM 120 Multi Species Blend	Reforestation Technologies Int. Gilroy, CA Phone: 1-800-784-4769 www.reforest.com
LALRISE Prime and Max WP	Lallemand Specialties Inc. Milwaukee, WI Phone: 1-844-590-7781 www.lallemandplantcare.com

Mulching (Grass Hay or Straw)

An additional 0.5 tons of Grass Hay or Straw Mulch has been added to the lump sum price for "Erosion Control" on areas determined by the Engineer during construction.

If the Contractor uses a no-till drill, mulch may be applied prior to seeding and the mulch can then be punched into the soil by the no-till drill. If the Contractor uses this process, the no-till drill seeding will be completed immediately following the mulch application and the mulch will be punched into the soil at a 3-inch depth.

Erosion Control Wattle

Erosion control wattles for restraining the flow of runoff and sediment will be installed at locations noted in the table and at locations determined by the Engineer during construction. Refer to Standard Plate 734.06 for details.

The Contractor will provide certification that the erosion control wattles do not contain noxious weed seeds.

Erosion control wattles will remain on the project to decompose.

The erosion control wattle provided will be from the approved product list. The approved product list for erosion control wattle may be viewed at the following internet site:

<http://apps.sd.gov/HC60ApprovedProducts/main.aspx>

LOCATION	WATTLES (FT)
WEST CROSSOVER ON I-90	160
TOTAL	160

High Flow Silt Fence

The high flow silt fence fabric provided will be from the approved product list. The approved product list for high flow silt fence may be viewed at the following internet site:

<http://apps.sd.gov/HC60ApprovedProducts/main.aspx>

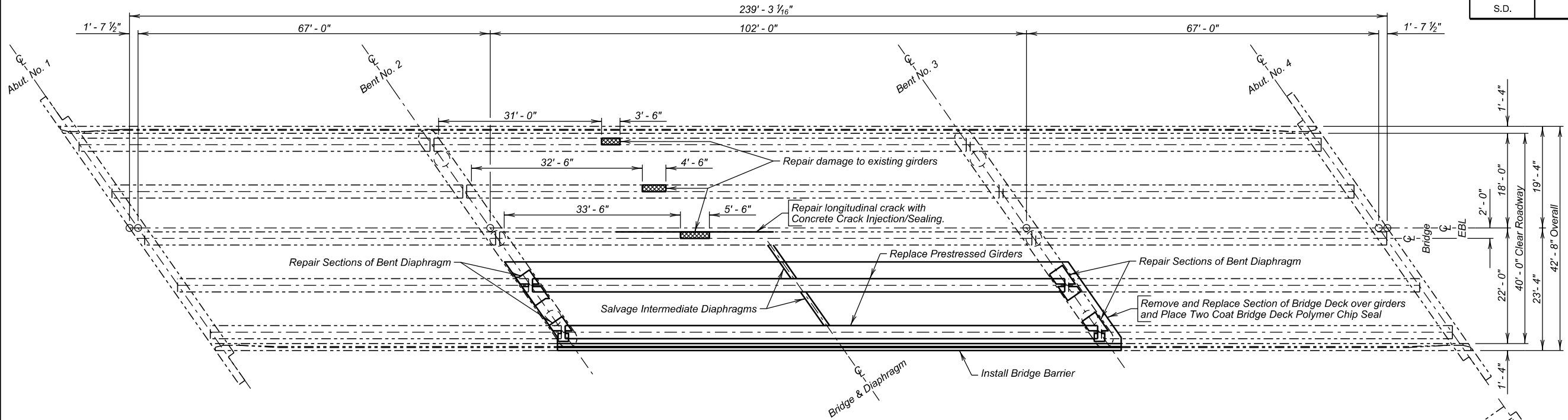
High flow silt fence will be placed at the locations noted in the table and at locations that will minimize siltation of adjacent streams, lakes, dams, or drainage areas as determined by the Engineer during construction. Refer to Standard Plate 734.05 for details.

LOCATION	SILT FENCE (FT)
WEST CROSSOVER ON I-90	25
TOTAL	25

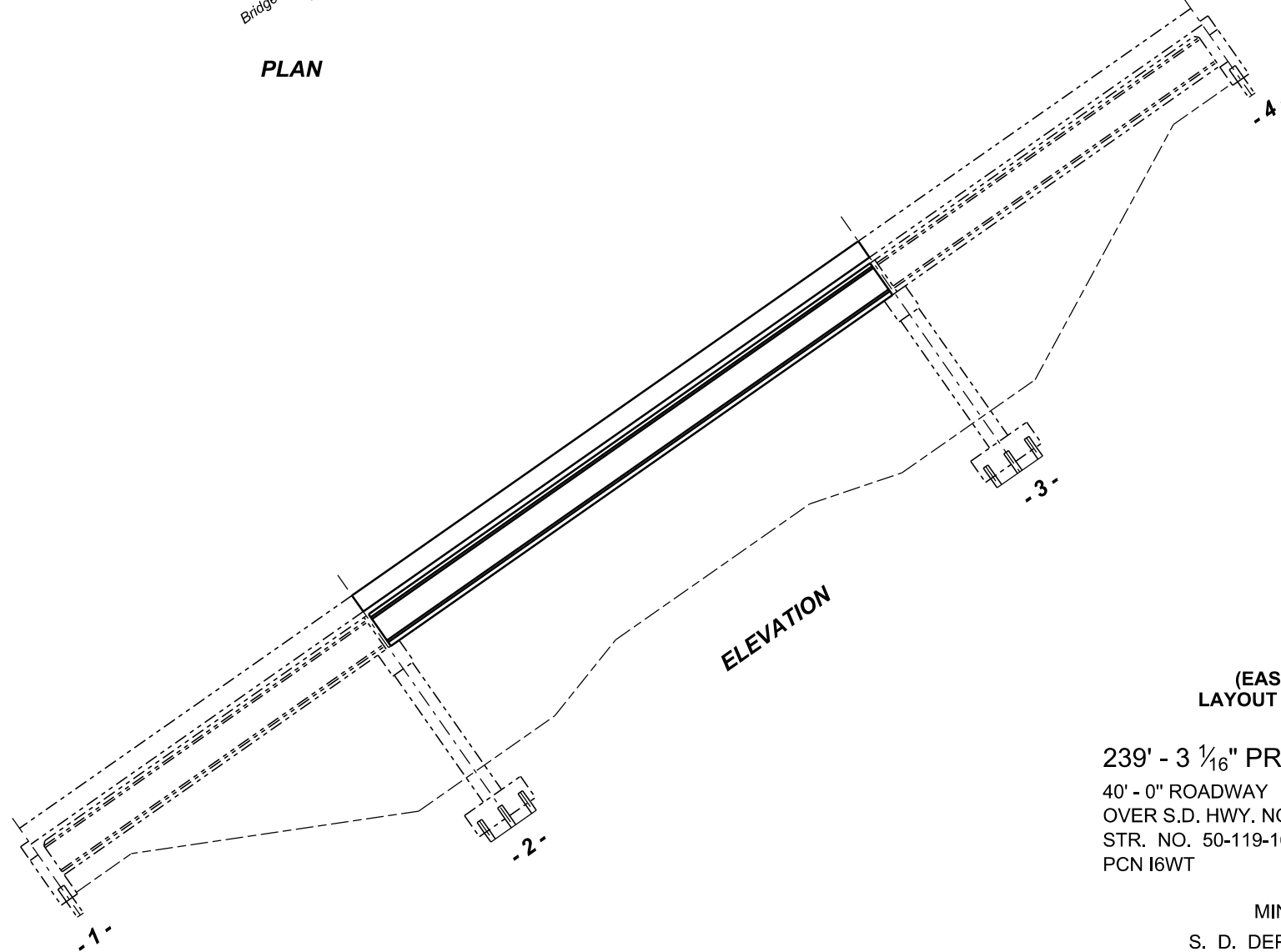
Remove Silt Fence

Silt fence will be removed as determined by the Project Engineer. All costs associated with removing silt fence will be included in the contract lump sum price for “Erosion Control”.

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	18	48



PLAN



ELEVATION

INDEX OF BRIDGE SHEETS -

Sheet No. 1 - Layout For Girder Repair
Sheet No. 2 - Estimate of Structure Quantities and Notes
Sheet Nos. 3 thru 6 - Notes (Continued)
Sheet No. 7 - Breakout Details (A)
Sheet No. 8 - Breakout Detail (B)
Sheet No. 9 - Superstructure Repair Details (A)
Sheet No. 10 - Superstructure Repair Details (B)
Sheet No. 11 - Bent Diaphragm Repair Details
Sheet No. 12 - Girder Erection Data
Sheet No. 13 - Girder Repair Details
Sheet No. 14 - Two Coat Bridge Deck Polymer Chip Seal Details
Sheet No. 15 thru 23 - Original Construction Plans




(EAST BOUND LANES)
LAYOUT FOR GIRDER REPAIR
FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE
40' - 0" ROADWAY
OVER S.D. HWY. NO. 38
STR. NO. 50-119-166
PCN I6WT

35° R.H.F. SKEW
SEC. 25-T102N-R51W
090 E-288
HS 20-44 & ALT.

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

PLANS BY:
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY TJM MINNI6WT	CK. DES. BY JKI I6WTBA01	DRAFTED BY JB	Steve A. Johnson BRIDGE ENGINEER
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			STATE OF S.D.	PROJECT 090 E-288	SHEET NO. 19	TOTAL SHEETS 48																																																																																
<div>ESTIMATE OF STRUCTURE QUANTITIES</div> <table><tr><th>ITEM NO.</th><th>DESCRIPTION</th><th>QUANTITY</th><th>UNIT</th></tr><tr><td>110E0040</td><td>Remove Concrete Bridge Slab</td><td>201.0</td><td>SqYd</td></tr><tr><td>460E0010</td><td>Class A45 Concrete, Bridge Barrier</td><td>9.0</td><td>CuYd</td></tr><tr><td>460E0030</td><td>Class A45 Concrete, Bridge Deck</td><td>57.6</td><td>CuYd</td></tr><tr><td>460E0190</td><td>Concrete Crack Injection/Sealing</td><td>360</td><td>In</td></tr><tr><td>460E0300</td><td>Breakout Structural Concrete</td><td>11.5</td><td>CuYd</td></tr><tr><td>460E0500</td><td>Deck Drain, Girder Bridge</td><td>2</td><td>Each</td></tr><tr><td>460E0600</td><td>Housing and Heating Concrete</td><td>66.6</td><td>CuYd</td></tr><tr><td>460E0650</td><td>Roadway Canopy</td><td>Lump Sum</td><td>LS</td></tr><tr><td>480E0100</td><td>Reinforcing Steel</td><td>457</td><td>Lb</td></tr><tr><td>480E0200</td><td>Epoxy Coated Reinforcing Steel</td><td>13,004</td><td>Lb</td></tr><tr><td>480E0505</td><td>No. 5 Rebar Splice</td><td>18</td><td>Each</td></tr><tr><td>480E0506</td><td>No. 6 Rebar Splice</td><td>18</td><td>Each</td></tr><tr><td>480E5000</td><td>Galvanic Anode</td><td>105</td><td>Each</td></tr><tr><td>491E0005</td><td>Two Coat Bridge Deck Polymer Chip Seal</td><td>185.1</td><td>SqYd</td></tr><tr><td>491E0110</td><td>Abrasive Blasting of Bridge Deck</td><td>185.1</td><td>SqYd</td></tr><tr><td>491E0120</td><td>Bridge Deck Grinding</td><td>185.1</td><td>SqYd</td></tr><tr><td>560E8067</td><td>63" Minnesota Shape Prestressed Concrete Beam, Install</td><td>203</td><td>Ft</td></tr><tr><td>560E9503</td><td>Prestressed Concrete Beam Repair</td><td>Lump Sum</td><td>LS</td></tr></table> <div>SPECIFICATIONS<div>1. Design Specifications: AASHTO Specifications for Highway Bridges 1983 Edition with 1984 thru 1987 Interims. Service Load was utilized for the deck slab. The prestressed girder beams were designed for a combination of both Service Load and Load Factor Design.</div><div>2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.</div></div> <div>DETAILS AND DIMENSIONS OF EXISTING BRIDGE<div>All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans and are provided as information only. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.</div></div> <div>BRIDGE DESIGN LOADING<div>The bridge deck, prestressed beams, and diaphragms are being replaced in kind. Therefore, the design follows the original Design Specifications.</div><div>1. HS20-44 AASHTO and Alternate</div><div>2. Dead Load includes a 22 psf future wearing surface on the roadway.</div></div> <div>PRE-CONSTRUCTION MEETING<div>A pre-construction meeting is required prior to beginning the repair work. The purpose of the meeting is to review the plans and procedures because of the specialty work involved. At a minimum, a representative from the contractor and all subcontractors will attend this meeting along with Department personnel from the Area Office and Bridge Office. The contractor must notify the Bridge Construction Engineer (BCE), through the Area Office, at least 3 days prior to beginning the repair work for the meeting.</div></div> <div>SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS<div>All work on this structure will be accomplished with the traffic control shown in the plans. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer two weeks prior to the pre-construction meeting.</div><div>1. Close South Dakota Highway 38. Install temporary barrier on the bridge deck. Saw cut and remove portion of bridge deck and barrier curb that is to be replaced.</div><div>2. Breakout diaphragms at the bents, salvage intermediate diaphragms, and remove two girder lines in the center span.</div><div>3. Grind the top of the existing grout pads.</div><div>4. Place new girders 4 and 5 along the with the salvaged intermediate diaphragm.</div><div>5. Switch traffic control and remove temporary barrier during head-to-head traffic.</div><div>6. Place concrete deck, barrier, and bent diaphragms. House and heat as required.</div><div>7. Remove spalled concrete from girders #1, #2, and #3.</div><div>8. Preload girders #2 and #3. Place concrete patches on girders #1, #2, and #3. House and heat as required.</div><div>9. Repair the longitudinal crack on girder #3 by Concrete Crack Injection/Sealing.</div><div>10. Open bridge to traffic by March 3rd, 2023, until the Two Coat Bridge Deck Polymer Chip Seal can by placed within the seasonal limitations.</div><div>11. In the Spring of 2023, install traffic control on mainline, grind and blast clean the new portion of the bridge deck. Place the Two Coat Bridge Deck Polymer Chip Seal on the new portion of deck. Apply commercial texture finish to the barrier.</div></div> <div>DESIGN MIX OF CONCRETE<div>1. All structural concrete will be Class A45 Concrete unless otherwise indicated.</div><div>2. Type II cement conforming to Section 750 is required.</div></div> <div>GENERAL CONSTRUCTION - BRIDGE<div>1. All reinforcing steel will conform to ASTM A615, Grade 60.</div><div>2. All exposed concrete corners and edges will be chamfered ¾-inch unless noted otherwise in the plans. Match existing chamfer if the existing chamfer differs.</div><div>3. Use 2-inch clear cover on all reinforcing steel except as shown otherwise.</div><div>4. Barrier curbs will be built perpendicular to the grade.</div><div>5. Requests for construction joints or reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.</div><div>6. Snap ties, if used in the barrier curb formwork, will be corrosion resistant. The corrosion resistant ties will be inert in concrete and compatible with the reinforcing steel.</div><div>7. All lap splices are contact lap splices unless noted otherwise.</div></div> <div>FALL PROTECTION<div>1. The Contractor will install a Fall Protection System conforming to OSHA Regulations. When working on the girders prior to decking installation, a Horizontal Lifeline – or other OSHA approved system will be installed. The Contractor will have one Personal Fall Arrest System (PFAS) available for use by a Department Inspector. The PFAS will be compatible with the installed Fall Protection System.</div><div>2. Modifications to any bridge components used to accommodate the Fall Protection System will be shown on the Falsework Plans and/or the appropriate Shop Plans. Field welding to bridge components will not be allowed. Field placed concrete inserts or drilled-in anchor bolts will be allowed if approved by the Engineer.</div></div> <div>ESTIMATE OF STRUCTURE QUANTITIES AND NOTES FOR 239' - 3 1/16" PRESTR. GIRDER BRIDGE STR. NO. 50-119-166 SEPTEMBER 2022</div> <div><table><tr><td>DESIGNED BY TJM MINN16WT</td><td>CK. DES. BY JKI 16WTMA02</td><td>DRAFTED BY TJM</td><td> BRIDGE ENGINEER</td></tr></table></div>							ITEM NO.	DESCRIPTION	QUANTITY	UNIT	110E0040	Remove Concrete Bridge Slab	201.0	SqYd	460E0010	Class A45 Concrete, Bridge Barrier	9.0	CuYd	460E0030	Class A45 Concrete, Bridge Deck	57.6	CuYd	460E0190	Concrete Crack Injection/Sealing	360	In	460E0300	Breakout Structural Concrete	11.5	CuYd	460E0500	Deck Drain, Girder Bridge	2	Each	460E0600	Housing and Heating Concrete	66.6	CuYd	460E0650	Roadway Canopy	Lump Sum	LS	480E0100	Reinforcing Steel	457	Lb	480E0200	Epoxy Coated Reinforcing Steel	13,004	Lb	480E0505	No. 5 Rebar Splice	18	Each	480E0506	No. 6 Rebar Splice	18	Each	480E5000	Galvanic Anode	105	Each	491E0005	Two Coat Bridge Deck Polymer Chip Seal	185.1	SqYd	491E0110	Abrasive Blasting of Bridge Deck	185.1	SqYd	491E0120	Bridge Deck Grinding	185.1	SqYd	560E8067	63" Minnesota Shape Prestressed Concrete Beam, Install	203	Ft	560E9503	Prestressed Concrete Beam Repair	Lump Sum	LS	DESIGNED BY TJM MINN16WT	CK. DES. BY JKI 16WTMA02	DRAFTED BY TJM	 BRIDGE ENGINEER
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SUPERSTRUCTURE

- Girder lifting hooks will be cut off before placement of concrete deck slab.
- The diaphragms at the bents will be poured integrally with the deck slab. Placement of diaphragms at the bents will not slow down the rate of deck concrete placement and finishing. The Contractor will place the concrete for the specified diaphragms ahead of the deck concrete in such a manner that advancement of the deck concrete reaches the diaphragm just as placement of concrete in the diaphragm is complete.
- The use of an approved deck finishing machine or screed will be required during placement of bridge deck concrete. The deck finishing machine will be adjusted and operated in such a manner that the screed or screeds are parallel with the centerline of the bridge. The finish machine and concrete placement will be parallel to the skew of the bridge. If a screed is used for deck placement, submit equipment information to the OBD for approval.

ROADWAY CANOPY

- It will be required that the bridge deck be cut into sections which can be lifted off the bridge. Do not allow these sections to fall into the canopy. Include details of the deck section breakout and removal methods in the Demolition Plan.
- The Contractor will construct a rigid canopy above highway 38 under the structure. The canopy is intended to capture smaller debris and not act as safety net for falling deck sections. As such, no traffic will be allowed under an area of active deck removal even with the canopy in place. The exception is traffic will be allowed under the canopy if the only removal occurring is using hand tools and chipping hammers. The canopy is an added safeguard and does not relieve the Contractor of any responsibility for the safety of the public. The canopy will meet the following minimum requirements.
 - The entire system will be above the bottom of the girders.
 - The canopy will be of a design and material which can adequately capture and contain falling debris as selected by the Contractor and approved by the Engineer.
 - The canopy will be constructed for the entire span before any breakout can occur.
 - The erection of the canopy will be completed in a manner which will cause the least inconvenience to the traveling public.
- The roadway canopy will be paid for at the contract lump sum price for Roadway Canopy. This payment will include all construction, maintenance, and removal of the roadway canopy.

CONCRETE BREAKOUT

- The Contractor will submit a detailed Demolition Plan, 7 days prior to any bridge deck removal. This Demolition Plan will include all canopy details, bridge deck slab removal, barrier removal, and bent diaphragm breakout details, and sequence of traffic control related to removal of the existing concrete.

- The existing girders #4 and #5, a portion of the deck, diaphragms at the bents, and curb will be broken out to the limits shown on the plans. Breakout limits will be defined with a 3/4" deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer. In areas where reinforcing steel and grout pads are to be salvaged, the Contractor will be limited to a 15 lb. jackhammer or smaller removal equipment or use hydro demolition. Reinforcing steel that is exposed and is scheduled for use in the new construction will be cleaned and straightened to the satisfaction of the Engineer.
- Any reinforcing steel that is damaged during concrete breakout will be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department.
- Any damage to the grout pad during concrete breakout will be repaired, as approved by the Engineer, by the Contractor at no cost to the Department. If grout pad repair is required, the mix will obtain A compressive strength of 2000 psi prior to erection of any beams. Chamfer edges of grout pads 3/4-inch.
- All broken out concrete, girders, and discarded reinforcing bars will become the property of the Contractor and will be disposed of at a site obtained by the Contractor and approved by the Engineer. An appropriate site will be as described in the Environmental Commitment Notes in the plans.
- All costs associated with breaking out and removal of concrete deck, removal of the existing damaged girders, barrier, cleaning and straightening of salvaged barrier and deck reinforcing, and any incidentals including labor, equipment, and materials necessary to complete the concrete removal outlined by these plans will be incidental to contract unit price per square yard for Remove Concrete Bridge Slab.
- All costs associated with breaking out and removal of concrete diaphragms, cleaning and straightening of salvaged reinforcing steel and prestressing strands, any incidentals including labor, equipment, and materials necessary to complete the concrete removal outlined by these plans will be incidental to the contract unit price per cubic yard for Breakout Structural Concrete.

HYDRODEMOLITION

- The Contractor has the option of using hydrodemolition for any of the concrete removal on this project. This work involves removal of concrete using high pressure water jets.
- Water will conform to Section 790 and be acceptable for use by the manufacturer of the hydrodemolition equipment.
- When hydrodemolition is used, a written water discharge plan will be submitted to the Engineer a minimum of 2 weeks before construction. The plan will detail how discharge water will be managed and controlled for each site. Concrete removal by hydrodemolition will not commence until the plan is approved.

- Hydrodemolition equipment will be capable of removing concrete to the required depth without damaging reinforcing steel and surrounding concrete. The machine will be capable of controlling the water pressure plus the angle and distance of the orifice head in relation to the concrete surface. The equipment must also have the ability to control the travel distance and the speed at which the head moves.
- The operator will be capable of adjusting the removal depths to the satisfaction of the engineer. The engineer may allow a test area on the bridge for the operator to determine what adjustments are necessary to get the proper depth of removals. If removal depths can't be controlled, hydrodemolition will not be allowed for concrete removals.
- The Contractor will provide protection and containment as required to prevent flying debris and water from leaving the construction area and entering a public travel way.
- If hydrodemoliton is used for removals, sawcutting and sandblasting may be eliminated; provided hydrodemoliton creates a vertical edge of at least 3/4 inch, reinforcing steel is clean, and the concrete surface is roughened to the satisfaction of the Engineer.
- Measurement will be based on the type of concrete removal that is being replaced with hydrodemoltion.
- Hydrodemolition will be paid for at the contract unit price for the concrete removal that is being replaced by hydrodemolition. Payment will be full compensation for equipment, labor, materials, and all other incidental items required to remove the concrete and to manage and control the water discharge.

FALSEWORK PLANS

- The Contractor will be required to include with his Falsework Plans, details for the construction of an adequate "Walk-Way" including railing.
- Falsework plans will be submitted a minimum of 7 days prior to erection of superstructure falsework.

NOTES (CONTINUED)
FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE

STR. NO. 50-119-166
SEPTEMBER 2022

GALVANIC ANODE

1. The Contractor will furnish and place galvanic anodes in the concrete repair areas where existing concrete is in contact with new concrete in the deck and barriers.

2. The galvanic anodes will be supplied as one of the following:

a. Galvashield XP2
Vector Corrosion Technologies
65114 140th Ave.
Wabasha, MN 55981
Phone: (507) 259-2481
Website: www.vector-corrosion.com

b. Sentinel Silver
Euclid Chemical Company
19218 Redwood Road
Cleveland, OH 44110
Phone: (800) 321-7628
Website: www.euclidchemical.com

c. Sika FerroGard 670
Sika Corporation US
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: (800) 933-7452
Website: <http://usa.sika.com>

3. The anodes will be placed in accordance with manufacturer's recommendations and as approved by the Engineer. The anodes have not been shown on the drawings. The Contractor will provide shop drawings of the galvanic anode installation including locations of the individual anodes to the Office of Bridge Design.

4. The anodes will be placed with a minimum ¾" cover and will be set in embedding mortar per the manufacturer's recommendations. The anodes will be fully encased in the concrete repair material. Where adequate cover does not exist, a concrete pocket will be chipped out behind the anode to provide sufficient cover. The Contractor may need to chip around the reinforcing bar locally at the anode installation to make the electrical connection. The reinforcing steel at the connection location will be cleaned per the manufacturer's recommendations to provide sufficient electrical connection and mechanical bond.

5. The electrical continuity of the connections and reinforcing steel will be confirmed per the manufacturer's recommendations.

6. In area of concrete repair where anodes are placed, the epoxy coating on the reinforcing steel will not require touch up.

7. The Contractor will provide manufacturer's product literature and installation instructions to the Engineer 10 days prior to installation.

8. All costs associated with placing anodes including labor, equipment, materials, and incidentals will be included in the contract unit price per each for Galvanic Anode.

9. The Contractor has the option of providing galvanic strip anodes in place of the Galvanic Anodes for the deck repair. The galvanic strip anodes will conform to the same requirements listed above for Galvanic Anode. The use of galvanic strip anodes in place of Galvanic Anodes will be at no additional cost to the Department. The galvanic strip anodes will be supplied as the following or an approved equivalent as approved by the Office of Bridge Design:
- Galvanode DAS
Vector Corrosion Technologies
65114 140th Ave.
Wabasha, MN 55981
Phone: (507) 259-2481
Website: www.vector-corrosion.com
- REPAIR OF PRESTRESSED GIRDERS
1. Remove all loose and broken concrete and breakout to sound concrete in spalled and delaminated areas on Girders #1, #2, and #3, as directed by the Engineer. Use ¾" deep saw cuts, to be made in sound concrete, to define the limits of breakout surrounding the damaged area. The minimum depth of concrete patch will be ¾". Use extreme care not to damage any strand during concrete breakout. Use chipping hammers not heavier than 15-pound class for concrete removal around strands or rebar. Blast clean the existing strands, exposed rebar and surrounding concrete.

2. Prior to girder repair, the Senior Region Bridge Engineer will inspect the exposed strands for damage such as gouges, flattening, or sharp bends. If damaged strands are found, the damage will be called to the attention of the BCE, who will determine whether the strands will be repaired and what the repair procedure will be if required.

3. The newly placed deck will reach a minimum compressive strength of 3500 psi prior to place of the preload.

4. Apply a preload prior to concrete patching of girder #2 and #3. Position a 2700 lb/ft uniform load on the deck, starting at 28' from Bent 2 ending at 44' from Bent 2 placed centered between girders #2 and #3. The total amount of preload is 43,200 lbs. Maintain the preload until the concrete patches have achieved a compressive strength of 3000 psi, as measured by concrete cylinders. If a truck is used to provide the 42,300 lb. Load, contact the BCE with axle spacing and weights. The BCE will provide the truck position to produce an equivalent 42,300 lb. load.

5. Areas to be patched must be sand blasted and cleaned immediately prior to priming and patching. All loose materials must be removed by sweeping and blowing out with clean, dry, oil free compressed air at 90 psi. When the clean and dry areas have been approved by the Engineer, they must be primed with an approved bonding agent as per the concrete patch material manufacturer's recommendations. Exposed strands must be coated with the bonding agent. The bottom of the flange will be formed to permit packing the concrete patch material into the repair area. Forms may be required by the Engineer elsewhere depending on the amount of concrete to be placed. The Contractor will provide the Engineer with technical data for the bonding agent.
6. The concrete patching material will be an approved product and will attain a minimum 28-day compressive strength of 5000 psi. The concrete patching material will be extended with aggregate of the quality, size and gradation specified in the manufacturer's technical literature.
- Two types of approved patching material are:
- a. Speed Crete Red Line
The Euclid Chemical Company
19218 Redwood Rd.
Cleveland, OH 44110
www.euclidchemical.com

b. Thorite Rapid Vertical
ChemRex Inc.
889 Valley Park Drive
Shakopee, MN 55379
800-433-9517
www.chemrex.com
- Use one of the above patching products, or an approved equal. Whichever concrete patching product is chosen the Contractor will provide technical literature to the Engineer prior to use.
7. All of the manufacturer's specifications will be followed for the final surface preparation, addition of aggregate, mixing, placement, curing, and temperature limits of the surrounding material and the concrete patch material.

8. Curing will be in accordance with the manufacturer's requirements or cured by the wet cure method which ever is more stringent. The wet cure will be for a minimum of 7 days or until 70% of the 28-day compressive strength has been reached, whichever is less. The 28-day compressive strength will be that listed in the manufacturer's technical literature.

9. The cost for concrete removal, cleaning, applying preload, placing new concrete, curing, cold weather protection and any other incidental items required to complete the work will be incidental to the contract lump sum price for Prestressed Girder Repair.
- NOTES (CONTINUED)
FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE
- STR. NO. 50-119-166
SEPTEMBER 2022
- 4 OF 23
- | | | | |
|--------------------------------|--------------------------------|-------------------|--|
| DESIGNED BY
TJM
MINN16WT | CK. DES. BY
JKI
16WTMA04 | DRAFTED BY
TJM | 
BRIDGE ENGINEER |
|--------------------------------|--------------------------------|-------------------|--|

COLD WEATHER PROTECTION REQUIREMENTS

Section 460.3 J restrictions on time of year for placement of Bridge Deck Concrete will not apply to this project. Bridge deck, barrier curb, and diaphragm concrete placed during the period 1 November to 1 April will conform to the following requirements:

- Concrete Mix: Maximum temperature of 160°F for mixing water and 100°F for aggregates. Aggregates will be free of frozen lumps, ice, or snow.
- The surface temperature or anything which will be in contact with the fresh concrete will be above freezing prior to placement, including forms, reinforcing steel, and adjacent concrete.
- The minimum concrete temperature at placement will be 50°F.
- After placement, the minimum concrete temperature will be 50°F for the first 72 hours and 40°F for the next 48 hours. Concrete temperatures below 35°F during the protection period will be cause for rejection.
- The maximum concrete temperature during the protection period will be 100°F.
- Concrete protection will be continued for at least 5 days, and until the bridge deck concrete compressive strength is a minimum of 3500 psi. Compressive strength will be determined by breaking cylinders which are cured within the enclosure. If it takes longer than 5 days to achieve 3500 psi, the concrete temperature will not fall below 35°F after the 5-day period.
- At the end of the protection period, the concrete temperature will not be permitted to fall more than 40°F for each 24-hour period.
- Enclosures for the protection of the bridge deck must be in place before any part of the bridge deck concrete falls below 50°F.
- Enclosures will be capable of maintaining the specified temperature and permit free circulation of artificial heat. Insulated blankets on top of the deck and freely circulated artificial heat below the deck will be permitted.
- No artificial heat source will be used which uses an open flame or introduces carbon dioxide into the enclosure where it can come into contact with fresh concrete.
- When artificially heated air is circulated over the deck surface, the relative humidity will be maintained at or above 80% within the enclosure, during the protection period. An acceptable system of sprinklers, which ensures that the bridge deck surface is continuously wet, may be used in lieu of the 80% humidity requirement.
- The Contractor will provide remote reading indoor/outdoor type thermometers for monitoring the concrete temperature during the protection period. The number and spacing of thermometers will be determined by the Engineer. Thermometers will generally be installed to measure the internal concrete temperature at a location approximately one inch below the top surface of the deck.
- During the protection period, the Contractor will be responsible for monitoring the enclosure at intervals acceptable to the Engineer. The Contractor will monitor concrete temperature, humidity (if required), and the structural integrity of the enclosure.
- Falsework will remain in place until the end of the protection period.

- The Contractor will submit a Cold Weather Protection Plan to the Engineer for approval, a minimum of 7 days prior to any deck pour. Such a plan will contain, at a minimum, information on the number and type of heat source to be used; a sketch detailing the enclosure to be used, including information on the enclosure materials; and any other information that is appropriate.
- All costs associated with housing and heating of the superstructure concrete and barriers including any incidentals, labor, equipment, and materials necessary to complete the construction outlined by these plans will be included in the contract unit price per cubic yard for Housing & Heating Concrete.

GIRDER PLACEMENT AND PREPURCHASE

- The prestressed girders and bearing pads have been prepurchased by the Department through a separate contract. All prepurchased materials are scheduled to be fabricated and available for delivery on or before November 9, 2022. The Contractor will be responsible for notifying both the Engineer and the Department’s Prestressed Girder Fabricator (Rinker Materials, Ph. 605-737-5208) of the date when the Contractor is ready to take delivery of the prepurchased materials. Upon this notice, the Department’s Prestressed Girder Fabricator will have 7 calendar days to deliver the materials to the project site. The Contractor will be responsible for unloading the materials delivered.
- If the pre-purchased materials need to be stored on the project site prior to erection, the Contractor will be responsible for storing the materials satisfactory to the Engineer in a safe location and in a manner that maintains the integrity and condition of the materials delivered. Any damage to the prepurchased items after delivery will be the Contractor’s responsibility and will be replaced or repaired to the satisfaction of the Engineer.
- The cost of the materials for tax purposes is \$57,002.40. The Contractor is responsible for paying State use tax, applicable City use tax and excise tax on these materials.
- The existing steel intermediate diaphragms between Girders #3 and #4 and Girders #4 and #5 will be salvaged and reinstalled with new bolts, nuts, direct tension indicators, and washers. The diaphragm between Girders #4 and #5 will be placed prior to placement of the deck concrete. The diaphragm between Girder #3 and #4 will be placed following the deck concrete placement, and it may need to be modified as approved by the Engineer to fit.
- All costs associated with the installation of the girders, tax, storage survey for slab forms, and removal and reinstallation of intermediate diaphragms, and grout pad grinding will be at the contract unit price per foot for 63” Minnesota Shape Prestressed Concrete Beam, Install.

DECK DRAINS

- The Contractor will have the option to salvage the existing deck drain to girder connections pending the approval of the Engineer. The prerequisite for the Contractor to choose this option is for the existing bent plates, U-bolts, nuts, and washers to show no indication of damage from the collision.
- Deck Drains will be 4” diameter x 7’-3” Schedule 40, Acrylonitrile Butadine-Styrene (ABS) Plastic Pipe conforming to the requirements of ASTM - D2661 or Schedule 40 ABS Plastic Pipe conforming to the requirements of ASTM - F628.
- The 4 1/2” diameter by 1” ABS Plastic Pipe Sleeves can be made from a 4 inch diameter (ABS) Pipe Coupler. They will be attached to the 4 inch diameter (ABS) Plastic Pipe, as shown in the plans with a solvent cement conforming to ASTM-D2235.
- The 3/8 inch diameter U-bolts, nuts and washers will conform to ASTM F1554 Grade 36, or ASTM A108 and will be galvanized in accordance with ASTM A153 or ASTM F2329 as applicable.
- Steel for the washers will conform to ASTM A709, Grade 36 and will be galvanized in accordance with ASTM A123. Washers will be plate washers or a continuous bar at least 5/16” thick with standard holes and will have a size sufficient to completely cover the slot after installation.
- The 1/2 inch diameter bolts and nuts will conform to ASTM A325 and will be galvanized in accordance with ASTM F2329 or ASTM A153 as applicable.
- The deck drain to girder connection as shown allows the deck drain location to be adjusted slightly to clear transverse slab steel.
- After the deck drains have been installed, the ABS plastic pipe and attaching hardware will be painted with Aluminum Filled Epoxy Mastic Primer, gray in color, conforming to Section 411 of the Construction Specifications. Prior to paint application, the ABS plastic pipe will be sanded to produce a roughened surface sufficient for paint adhesion.
- Payment for deck drains will be at the contract unit price per each for Deck Drains, Girder Bridge, and will be full compensation for furnishing, fabricating, installing and painting the deck drains and all attaching hardware.

COMMERCIAL TEXTURE FINISH

A Class B commercial texture finish will be applied to the barrier faces and diaphragms at the bents. The color will match the existing concrete as approved by the Engineer.

NOTES (CONTINUED)
FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE

STR. NO. 50-119-166
SEPTEMBER 2022

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	23	48

TWO COAT BRIDGE DECK POLYMER CHIP SEAL

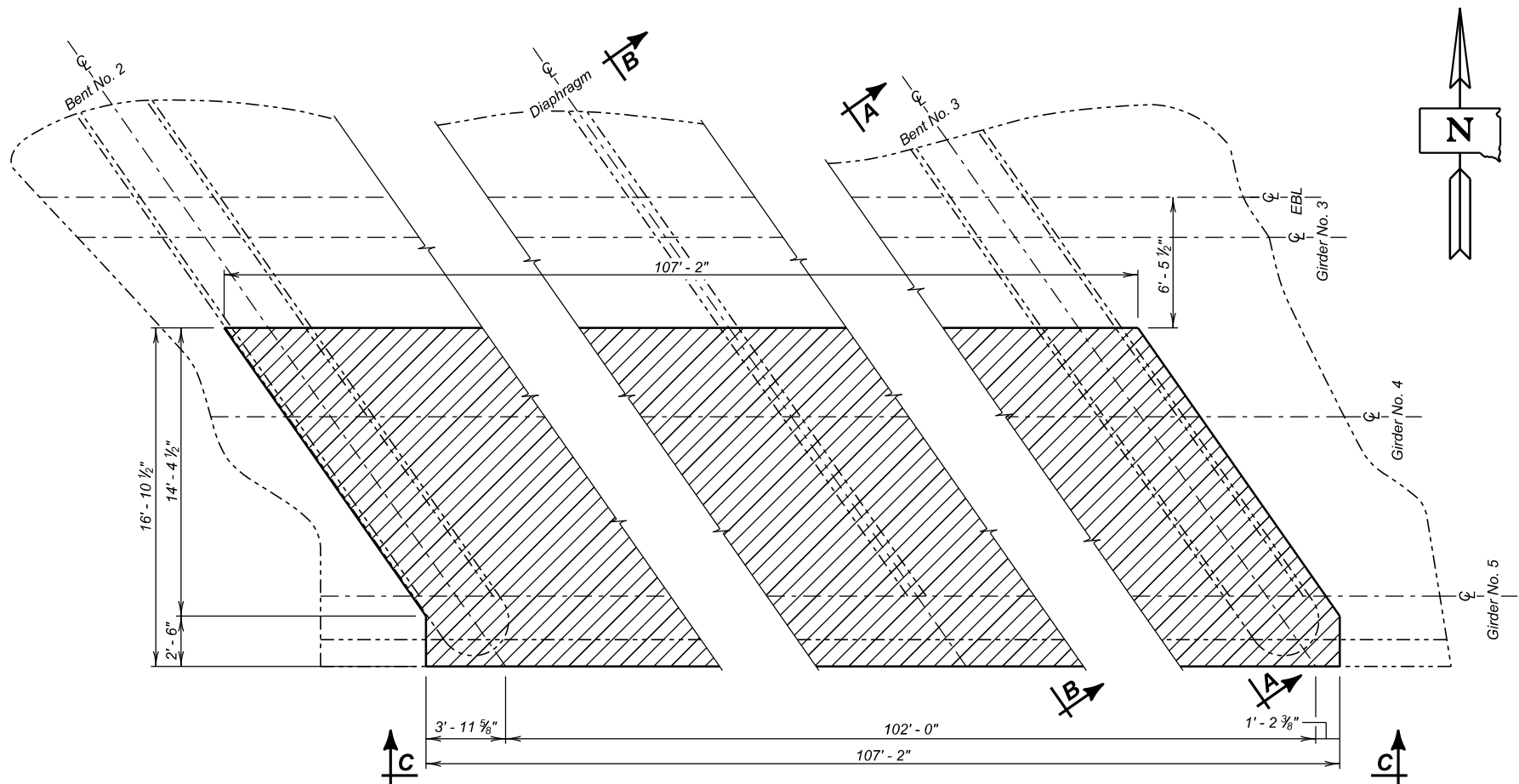
The polymer will conform to Type I per the Department's Approved Products List for Bridge Deck Polymer Chip Seal.

CONCRETE CRACK INJECTION/SEALING

1. This work will consist of cleaning the concrete surfaces adjacent to the cracks, installing epoxy injection ports or tees, sealing the surface of the cracks, and epoxy injecting the cracks.
2. Concrete surfaces adjacent to the cracks will be cleaned to the extent necessary to achieve adequate bond for the surface sealant. The preparation will not cause dust or other contaminants to penetrate the crack. The crack will be cleaned of dust and debris using clean, oil free compressed air. The use of solvents or thinners will not be permitted.
3. The cracks to be injected will have injection ports or tees installed in them. The ports or tees will be spaced between 6 to 12 inches, or as specified by the manufacturer. The ports or tees will be placed in dust free holes made with either vacuum drills or chipping hammers.
4. The surface cracks between the ports will be sealed using an epoxy paste or as specified by the manufacturer. The application of the surface crack sealer will be limited to clean dry surfaces.
5. Epoxy injection will use a process that will ensure complete penetration of the crack. The epoxy will be injected at a low enough pressure to ensure that no further damage will be done to the member being repaired.
6. The injection epoxy will conform to ASTM C881, Type IV, Grade1. The Class of the epoxy-resin bonding system will be based on the concrete temperature at the time of the repair. If the temperature of the concrete is below 40°F or the manufacturer's recommendations, whichever is lower, the crack repair will have to be completed in the Spring.
7. After the epoxy has cured a minimum of 48 hours, the injection ports or tees will be removed flush with the concrete surfaces and the surface crack sealer will be ground smooth.
8. The Contractor will submit a Concrete Crack Injection/Sealing procedure in writing, for approval of the BCE, thirty days prior to performing the crack injection and notify the Department of the Contractor's schedule seven days prior to performing the crack injection.
9. The cracks to be injected will be measured in inches to the nearest inch. Measurement will be made of the overall crack length.
10. All costs of cleaning the concrete adjacent to the cracks to be sealed, installing the ports or tees, sealing and injecting the cracks, and removal and grinding of the ports and sealant including labor, equipment, and incidentals necessary to complete the work will be incidental to the contract unit price per inch for Concrete Crack Injection/Sealing.

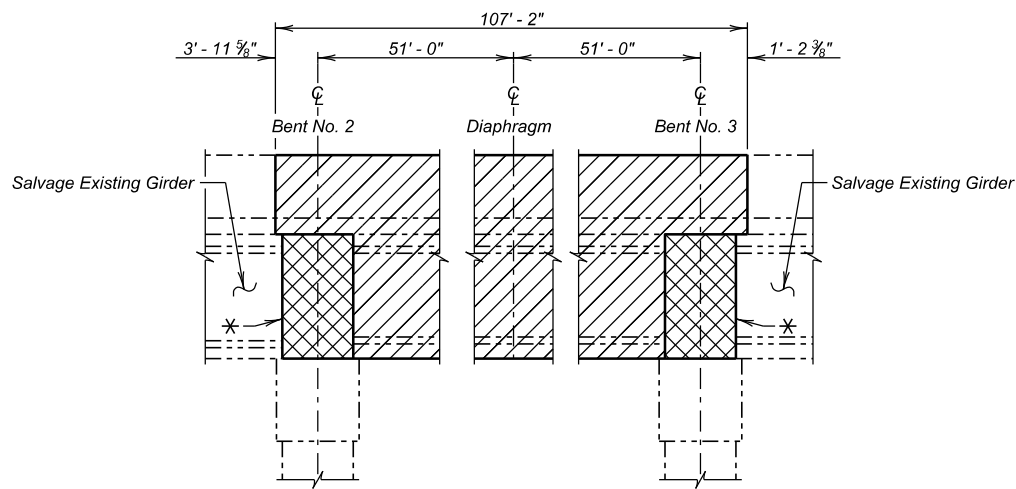
NOTES (CONTINUED)
FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE
STR. NO. 50-119-166
SEPTEMBER 2022

DESIGNED BY TJM MINNI6WT	CK. DES. BY JKI 16WTMA06	DRAFTED BY TJM	 BRIDGE ENGINEER
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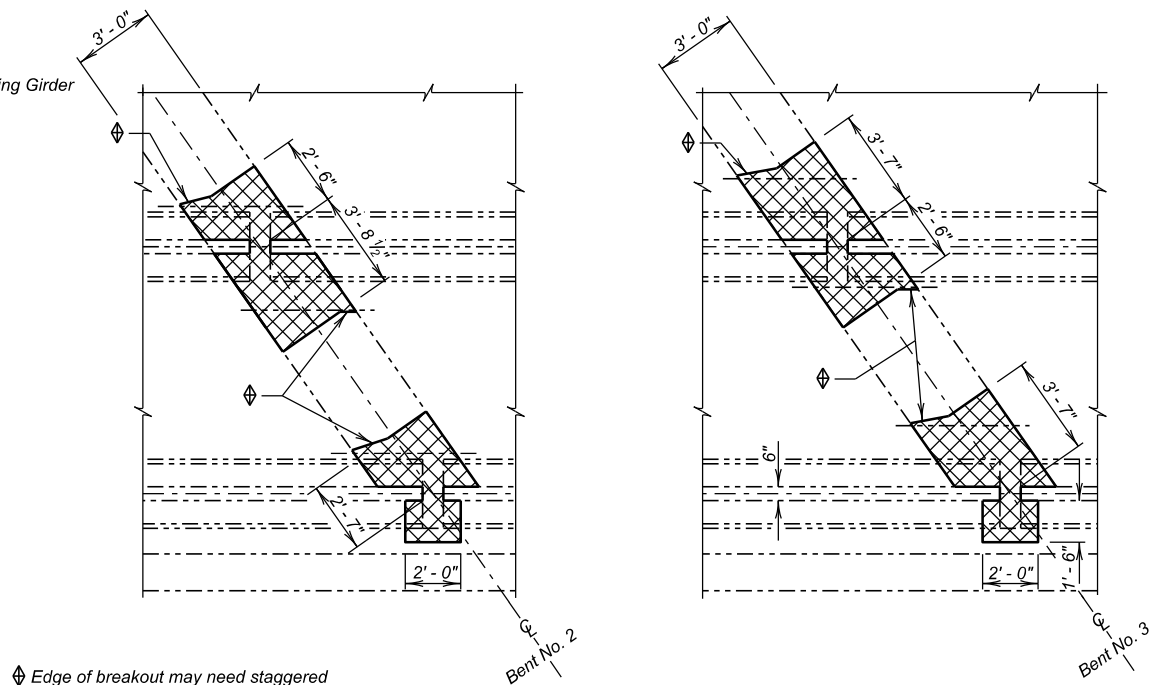
PLAN
(Deck Removal)

Shaded Area Indicates Limits of Slab Removal
Shaded Area Indicates Limits of Concrete Breakout



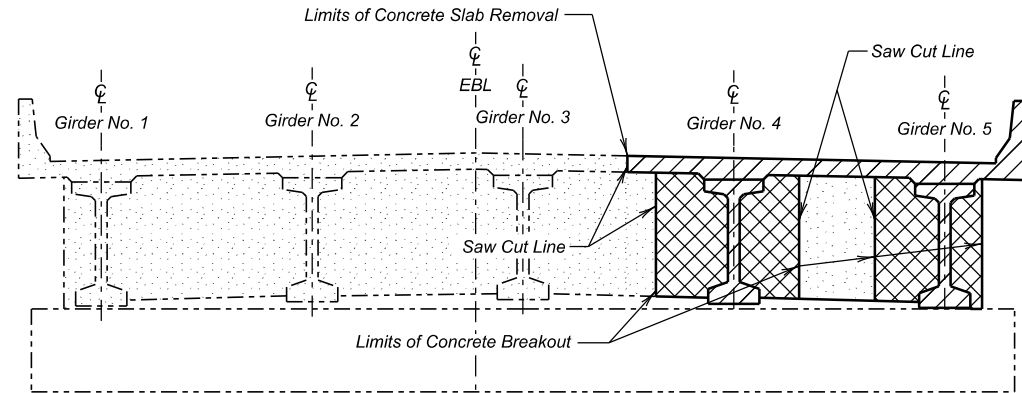
VIEW C - C

* Care will be taken not to damage the end of the existing girders and strands embedded in the diaphragm. The damaged girders will be completely removed.

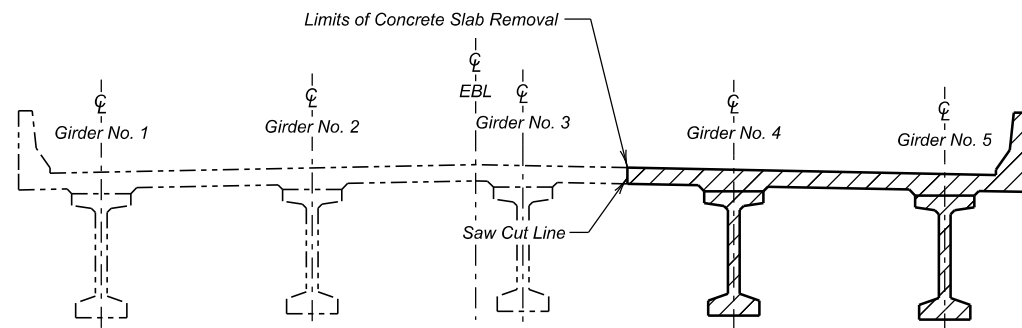


Edge of breakout may need staggered to be able to completely remove the U2 or U3 bar at the edge of the breakout area.

PLAN
DIAPHRAGM Breakout
(Girder and Deck Breakout Not Shown)



SECTION A - A



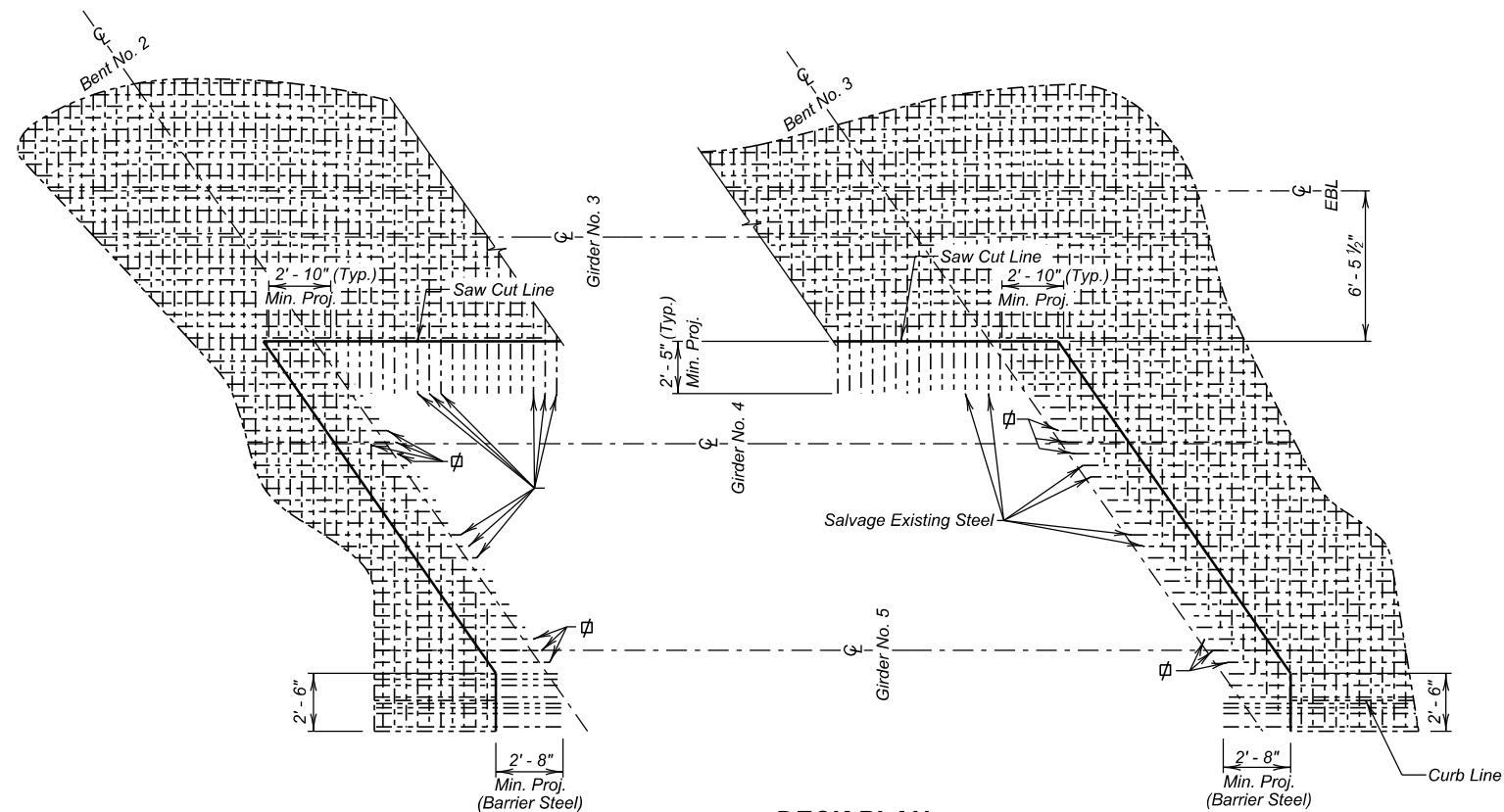
SECTION B - B

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Remove Concrete Bridge Slab	SqYd	201.0
Breakout Structural Concrete	CuYd	11.5

(EAST BOUND LANES)
BREAKOUT DETAILS (A)
FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE
40' - 0" ROADWAY 35° R.H.F. SKEW
OVER S.D. HWY. NO. 38 SEC. 25-T102N-R51W
STR. NO. 50-119-166 090 E-288

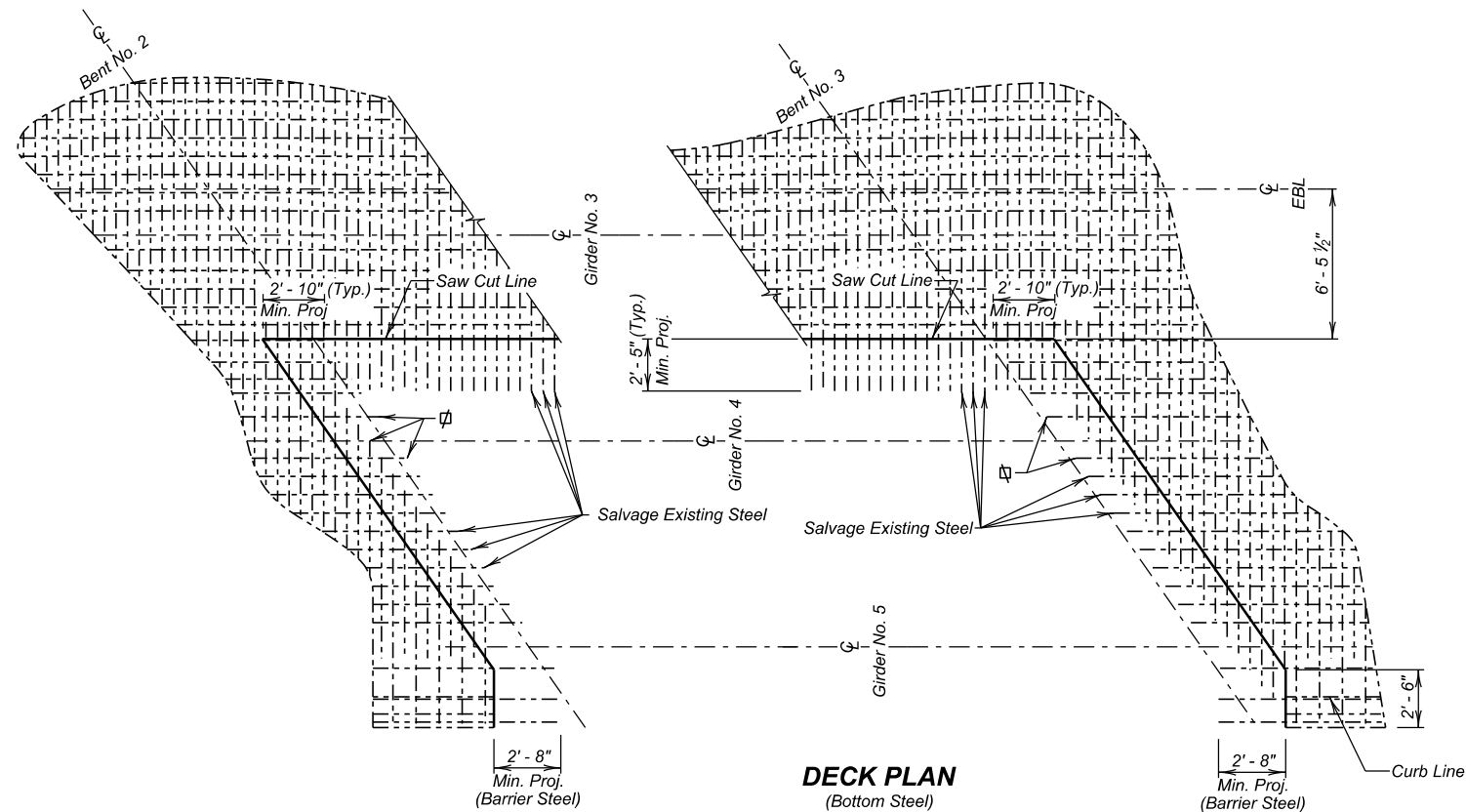
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	25	48

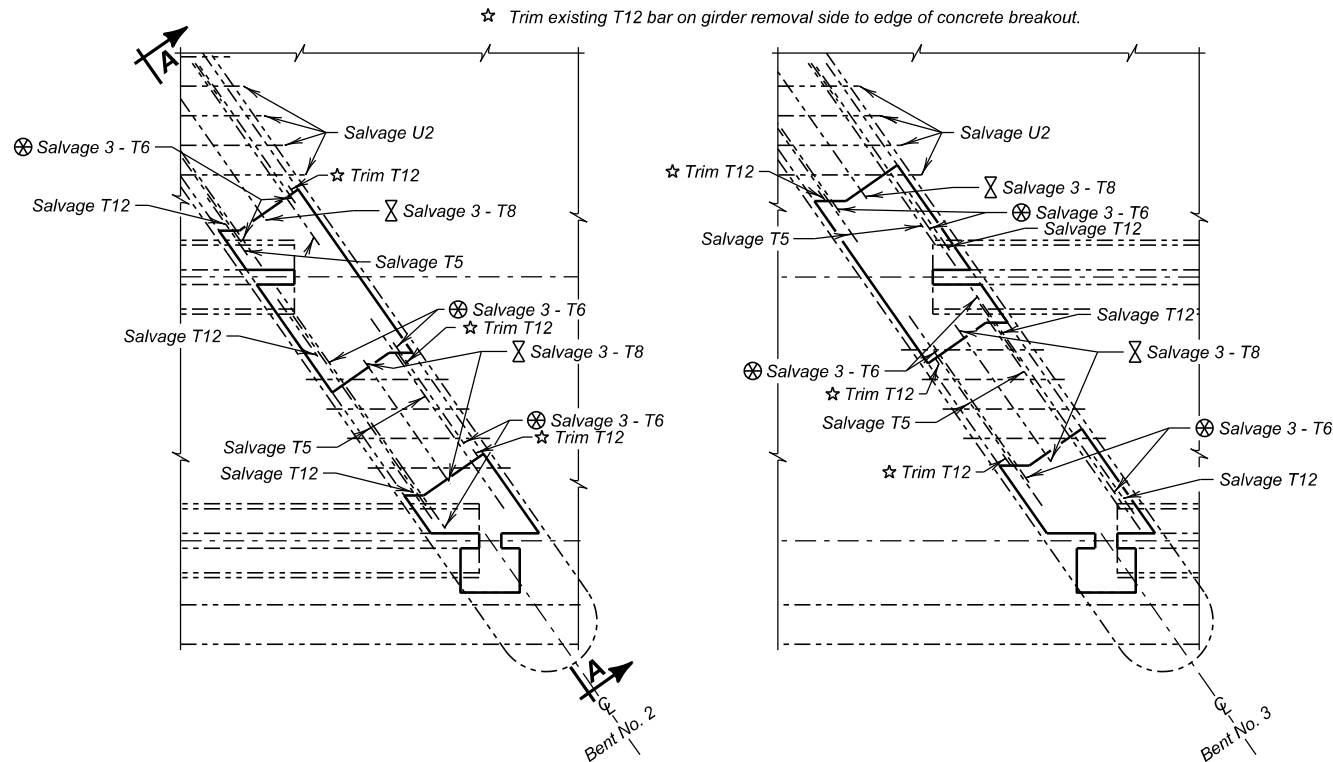


DECK PLAN
(Top Steel)

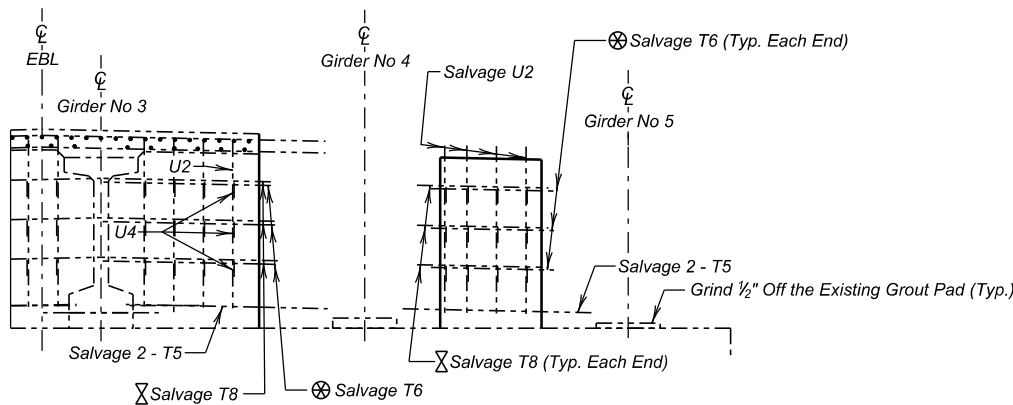
⌀ If required, bars adjacent to the girder can be bent out of the way for girder placement. The bars will be as minimally as possible to accomplish the girder placement and should not result in deformation of the reinforcing bar.



DECK PLAN
(Bottom Steel)



BENT DIAPHRAGMS PLAN
(Grout Pad Not Shown)



SECTION A - A
(Bent 2 Shown, Bent 3 Similar)

- ⊗ Salvage Sufficient Length for Mechanical Splice
- ⊗ Salvage sufficient length for mechanical splice on girder removal side, salvage full length on opposite face.

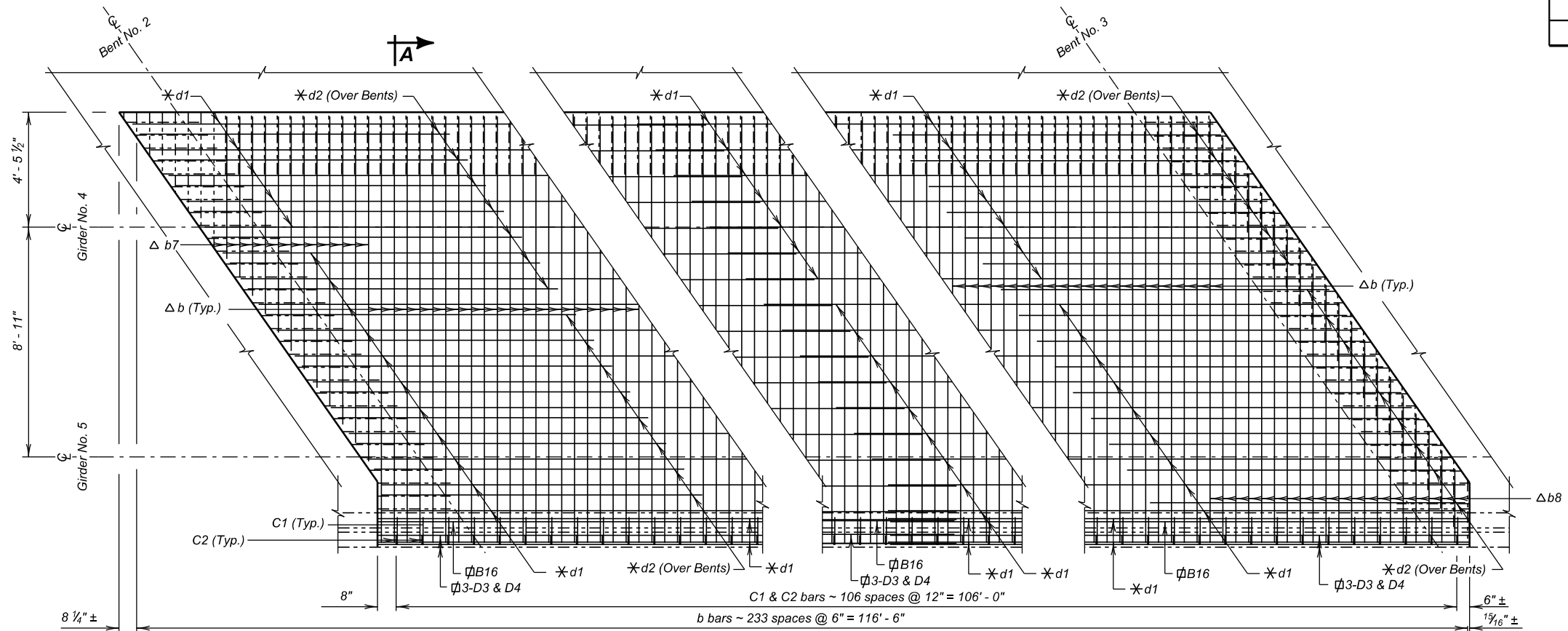
**(EAST BOUND LANES)
BREAKOUT DETAILS (B)**

FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE
40' - 0" ROADWAY 35° R.H.F. SKEW
OVER S.D. HWY. NO. 38 SEC. 25-T102N-R51W
STR. NO. 50-119-166 090 E-288

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

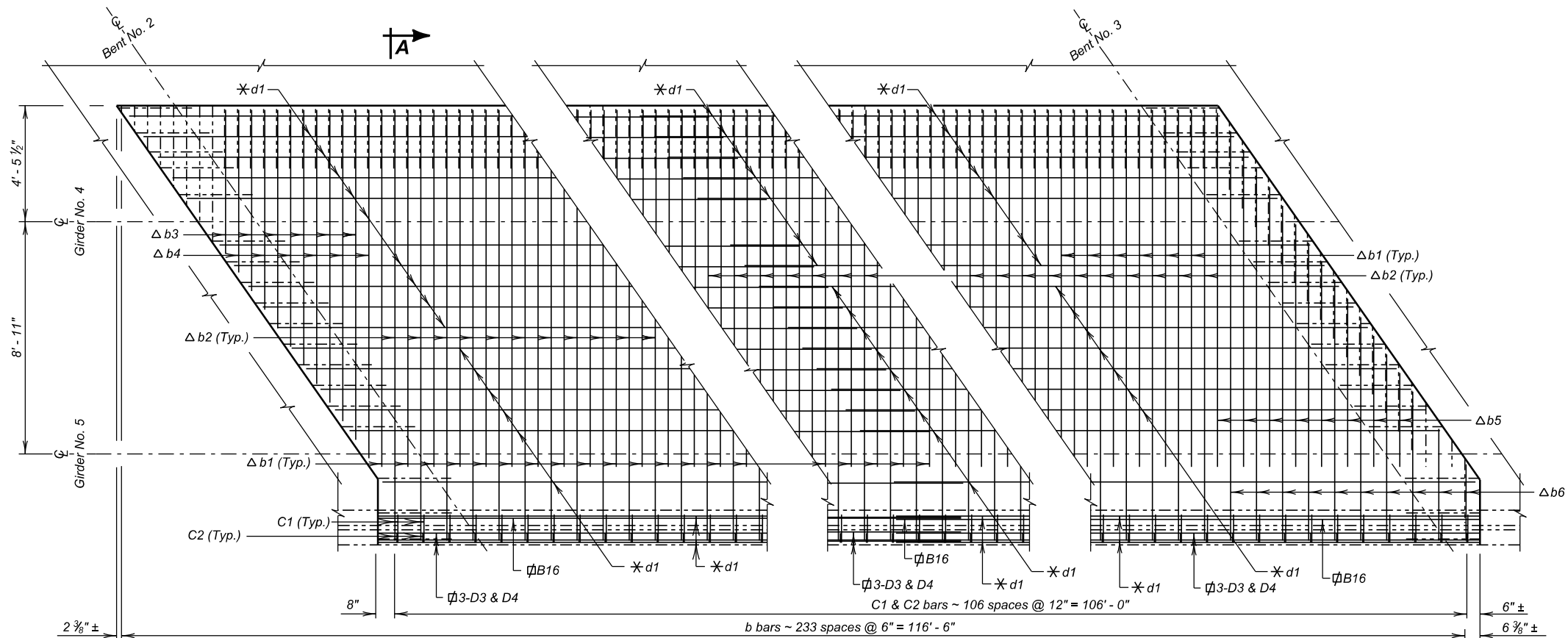
DESIGNED BY TJM MINN16WT	CK. DES. BY JKI I6WTBA08	DRAFTED BY JB	Steve A. Johnson BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	26	48



PLAN
(TOP STEEL)
(Salvaged reinforcing steel shown, callouts and concrete shading excluded for clarity)

Δ Min. Lap = 2' - 3" (All Transverse Reinforcing Steel)
ϕ Min. Lap = 2' - 6" (All Barrier Reinforcing Steel)
✱ Min. Lap = 2' - 8" (All Longitudinal Reinforcing Steel)



PLAN
(BOTTOM STEEL)
(Salvaged reinforcing steel shown, callouts and concrete shading excluded for clarity)

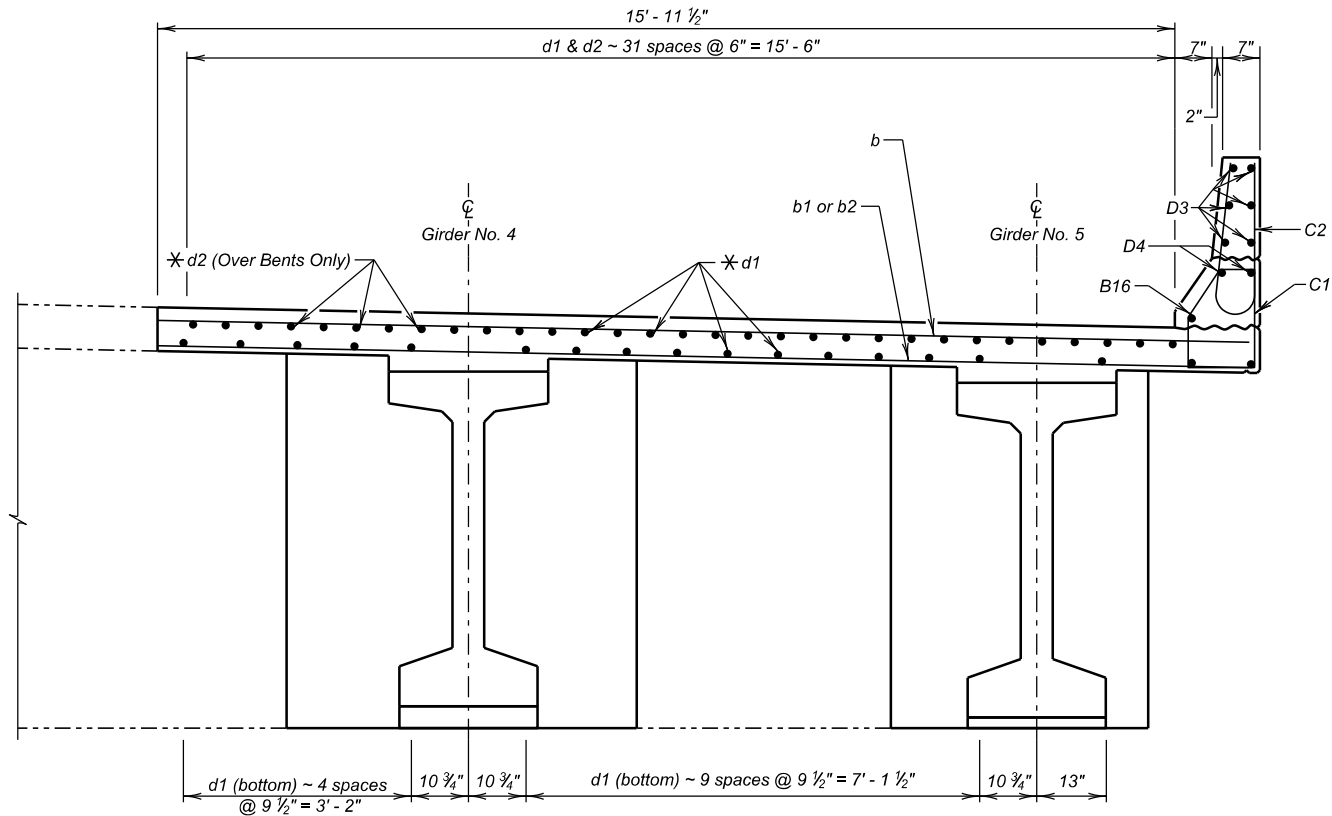
(EAST BOUND LANES)
SUPERSTRUCTURE REPAIR DETAILS (A)

FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE
40' - 0" ROADWAY
OVER S.D. HWY. NO. 38
STR. NO. 50-119-166

35° R.H.F. SKEW
SEC. 25-T102N-R51W
090 E-288

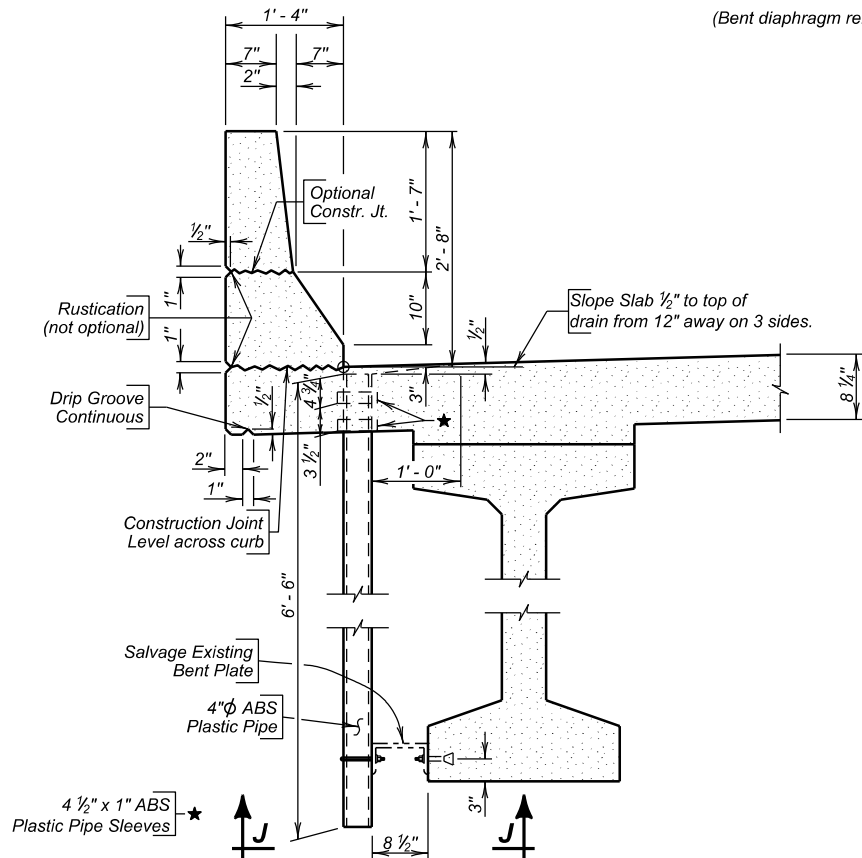
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

DESIGNED BY TJM MINN16WT	CK. DES. BY JKI 16WTRA09	DRAFTED BY KR	Steve A. Johnson BRIDGE ENGINEER
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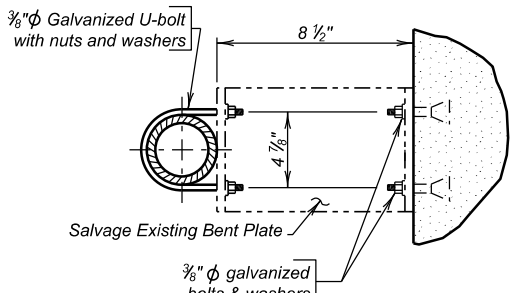


SECTION A - A

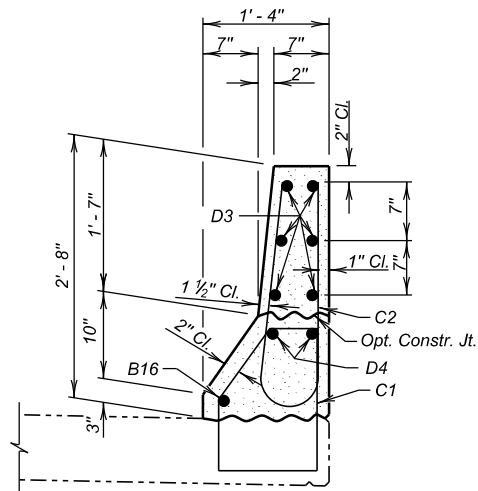
(Bent diaphragm reinforcing steel and concrete shading excluded for clarity)



DECK DRAIN AND BARRIER DETAILS



VIEW J - J



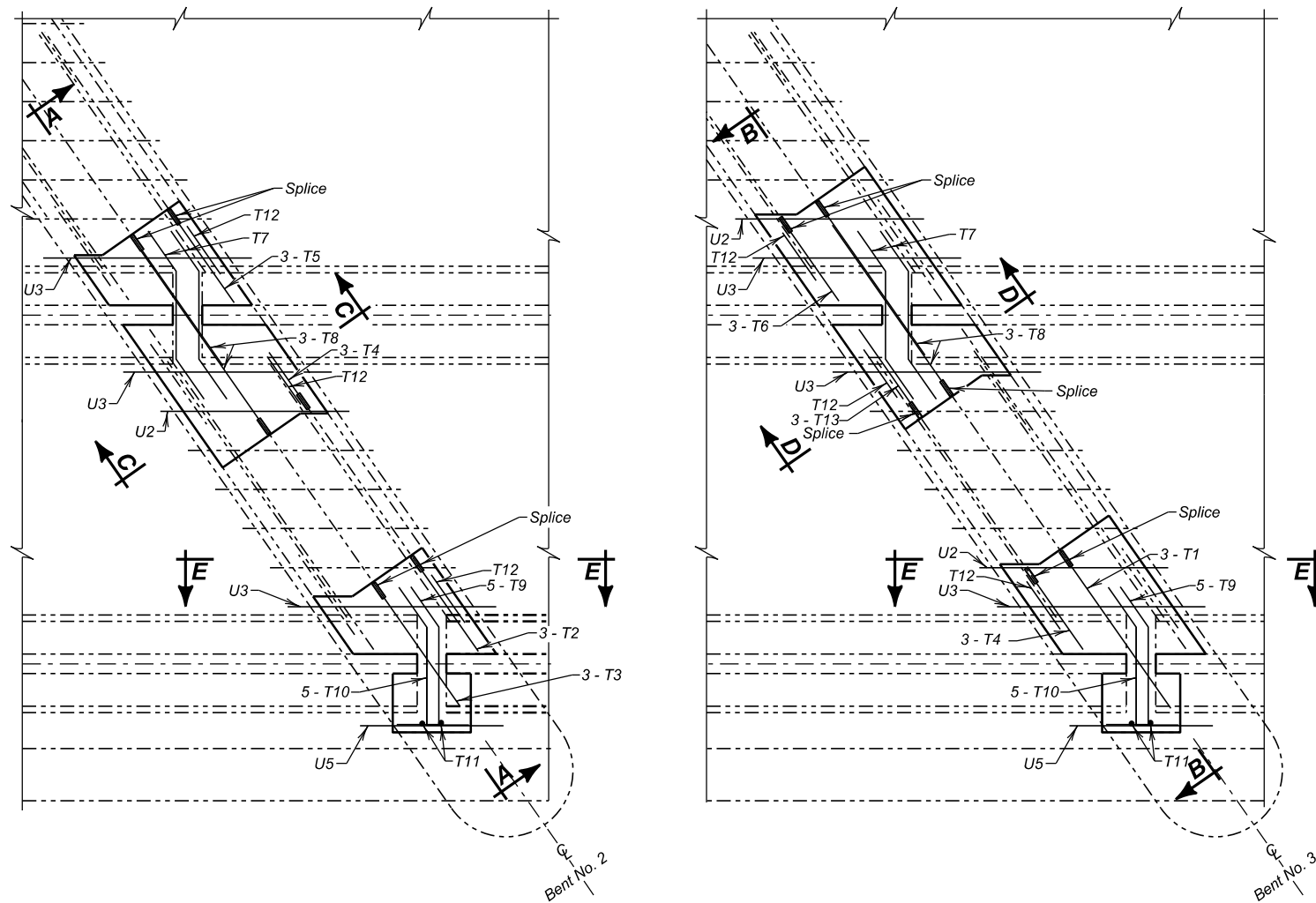
BARRIER DETAILS

REINFORCING SCHEDULE (Deck and Barrier)					
Mk.	No.	Size	Length	Type	Bending Details
b	194	5	16' - 6"	Str.	
b1	97	5	13' - 9"	Str.	
b2	97	4	16' - 6"	Str.	
b3	3	5	18' - 4"	Str.	
b4	3	4	19' - 9"	Str.	
b5	4	5	17' - 1"	Str.	
b6	5	4	18' - 6"	Str.	
b7	6	5	19' - 0"	Str.	
b8	10	5	19' - 2"	Str.	
B16	2	4	54' - 10"	Str.	
C1	107	5	5' - 10"	T2A	
C2	107	5	5' - 1"	S11	
d1	68	5	54' - 10"	Str.	
d2	30	6	12' - 9"	Str.	
D3	12	4	54' - 10"	Str.	
D4	4	5	54' - 10"	Str.	
Bar Cutting Details:					
b8	2' - 9 1/2"	16' - 4 1/2"			
b7	5' - 7"	13' - 5"			
b6	2' - 10"	15' - 8"			
b5	3' - 6 1/2"	13' - 6 1/2"			
b4	6' - 3 1/2"	13' - 5 1/2"			
b3	5' - 7"	12' - 9"			
b3	8' - 5"	9' - 11"			
b4	9' - 2"	10' - 7"			
b5	7' - 10"	9' - 3"			
b6	8' - 6 1/2"	9' - 11 1/2"			
b7	9' - 2"	9' - 10"			
b8	9' - 2 1/2"	9' - 11 1/2"			
NOTES:					
All Dimensions are out to out of bars.					
All Bars to be Epoxy Coated.					
✱ Cut Bars					

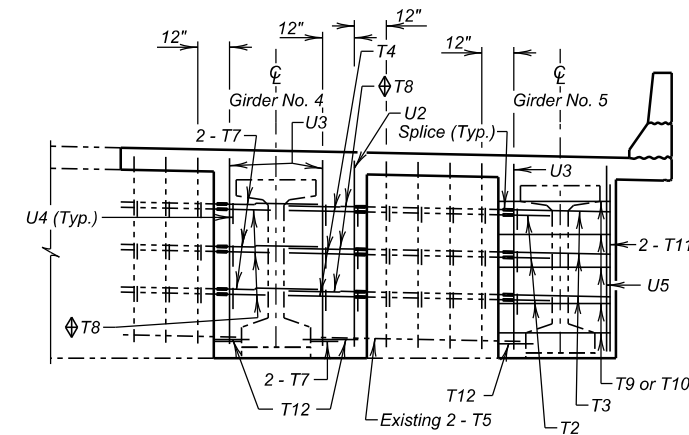
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Bridge Barrier	CuYd	9.0
Class A45 Concrete, Bridge Deck	CuYd	46.1
Deck Drain, Girder Bridge	Each	2
Housing and Heating Concrete	CuYd	55.1
Epoxy Coated Reinforcing Steel	Lb	12771
Galvanic Anode	Each	105

(EAST BOUND LANES)
SUPERSTRUCTURE REPAIR DETAILS (B)
FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE
40' - 0" ROADWAY
OVER S.D. HWY. NO. 38
STR. NO. 50-119-166
35° R.H.F. SKEW
SEC. 25-T102N-R51W
090 E-288

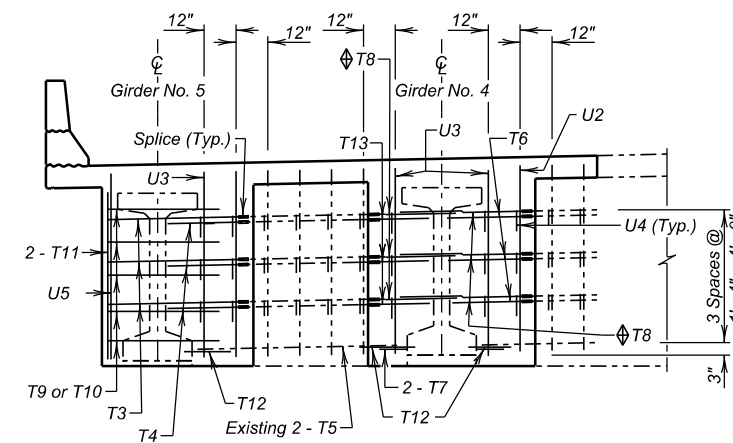
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022



PLAN

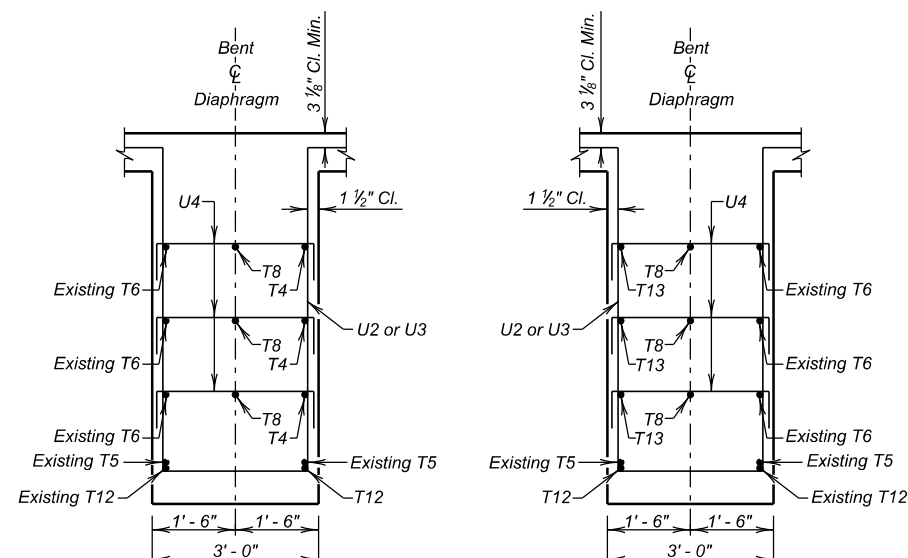


SECTION A - A



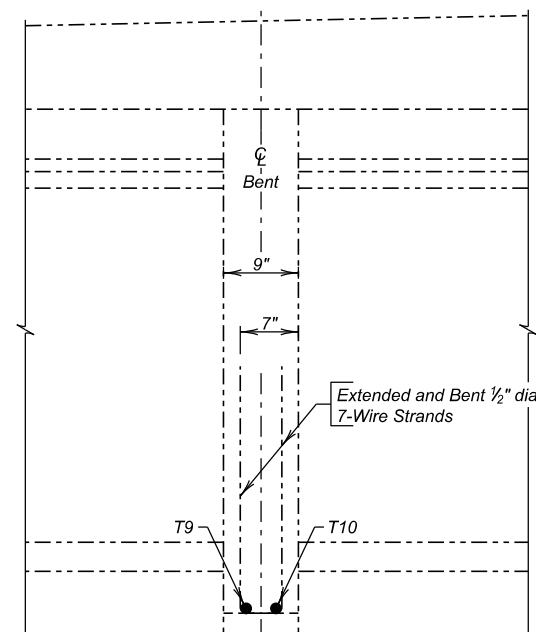
SECTION B - B

◆ Lap Bar 2' - 8"



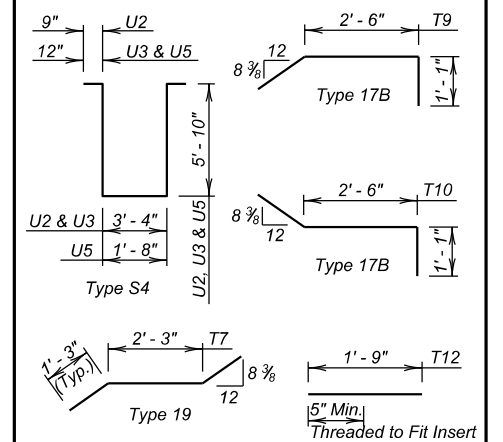
SECTION C - C

SECTION D - D



SECTION E - E

REINFORCING SCHEDULE					Bending Details	
Mk.	No.	Size	Length	Type		
☆	T1	3	6	4' - 2"	Str.	
☆	T2	3	5	2' - 3"	Str.	
☆	T3	3	6	3' - 2"	Str.	
☆	T4	6	5	1' - 9"	Str.	
☆	T5	3	5	2' - 1"	Str.	
☆	T6	3	5	1' - 8"	Str.	
☆	T7	4	5	4' - 9"	19	
☆	T8	12	6	3' - 9"	Str.	
☆	T9	10	5	12' - 3"	17B	
☆	T10	10	5	4' - 10"	17B	
☆	T11	4	5	5' - 3"	Str.	
☆	T12	6	6	1' - 9"	Str.	
☆	T13	3	5	2' - 0"	Str.	Type 17A
≠	U2	3	4	16' - 6"	S4	
≠	U3	6	6	17' - 0"	S4	
≠	U4	27	4	4' - 8"	17A	
≠	U5	2	6	15' - 4"	S4	



All dimensions are out to out of bars.

☆ *Spliced*

≠ Epoxy Coated

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
<i>Class A45 Concrete, Bridge Deck</i>	CuYd	11.5
<i>Housing and Heating Concrete</i>	CuYd	11.5
<i>Reinforcing Steel</i>	Lb	457
<i>Epoxy Coated Reinforcing Steel</i>	Lb	233
<i>No. 5 Rebar Splice</i>	Each	18
<i>No. 6 Rebar Splice</i>	Each	18

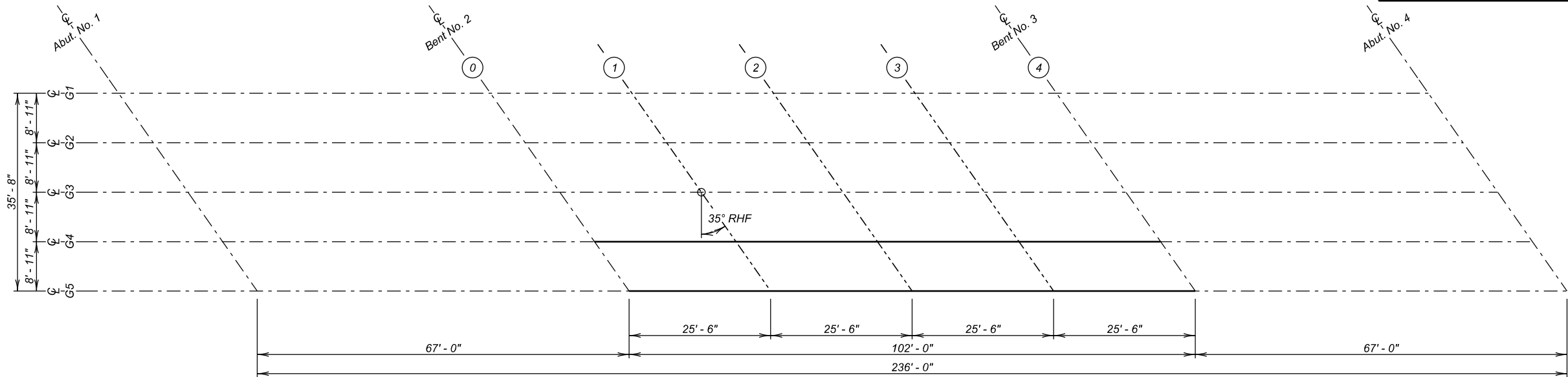
(EAST BOUND LANES)
BENT DIAPHRAGM REPAIR DETAILS

FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE
40' - 0" ROADWAY
OVER S.D. HWY. NO. 38
STR. NO. 50-119-166

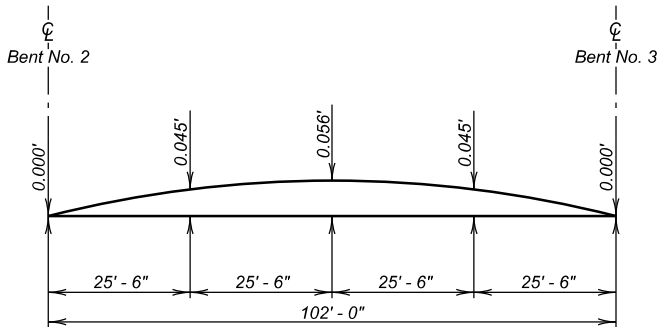
35° R.H.F. SKEW
SEC. 25-T102N-R51W
090 E-288

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

DESIGNED BY TJM MINN16WT	CK. DES. BY JKI 16WTR411	DRAFTED BY KR Steve A Johnson BRIDGE ENGINEER
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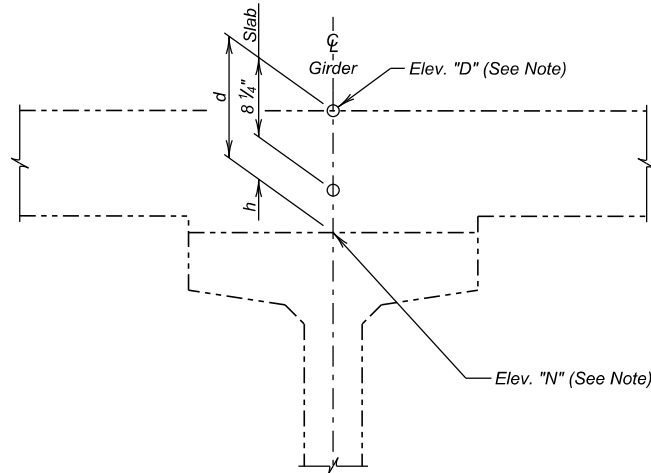


GIRDER LAYOUT



CAMBER DIAGRAM

The Camber shown above is the amount which will be added to field measured slab elevations (D) to get the slab form elevations (M) in the table of Slab Form Elevations and Calculations. Camber shown is for D.L. of slab, traffic barrier, diaphragms and camber growth, but does not include D.L. of beams.



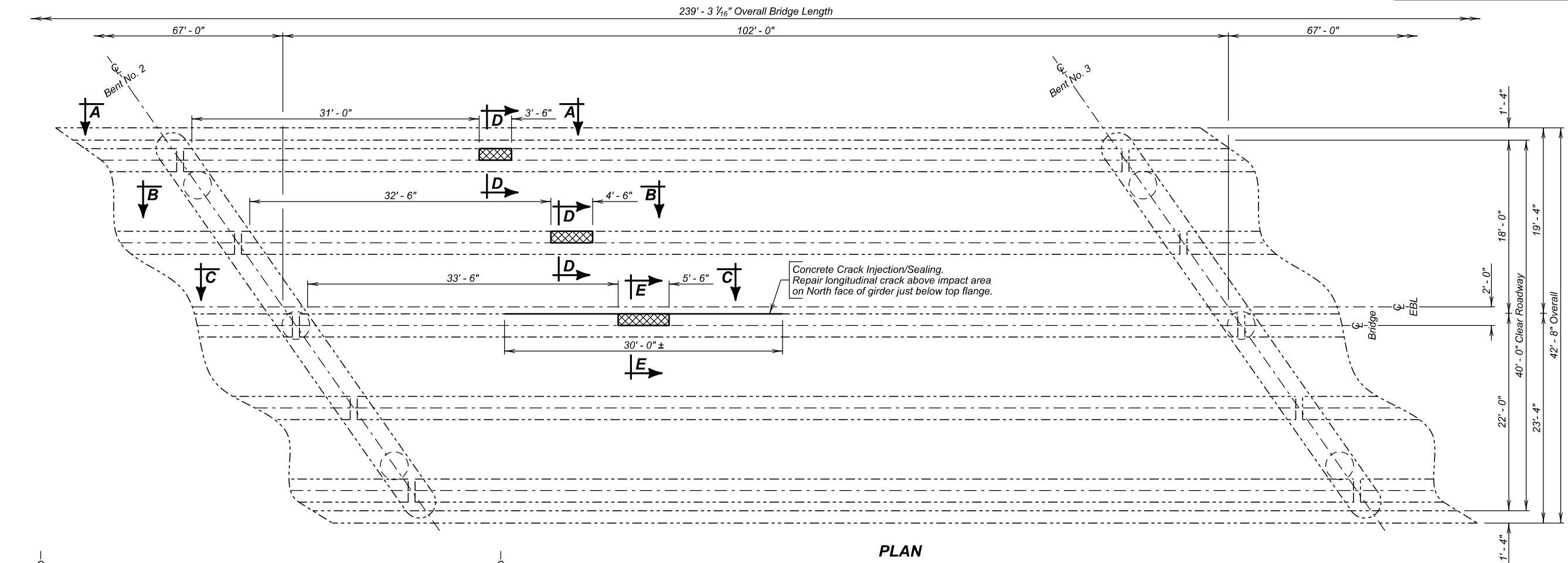
		SLAB FORM ELEVATIONS AND CALCULATIONS				
		0	1	2	3	4
Girder No. 4	Elev. "D"					
	(+) Camber	0	.045	.056	.045	0
	(=) Elev. "M"					
	(-) Elev. "N"					
	(=) d					
	(-) 0.688					
Girder No. 5	(=) h					
	Elev. "D"					
	(+) Camber	0	.045	.056	.045	0
	(=) Elev. "M"					
	(-) Elev. "N"					
	(=) d					
Girder No. 6	(-) 0.688					
	(=) h					

NOTE -
The table contains the information necessary to determine the depth of concrete over the girder at points shown. Calculations may be carried in the spaces provided. Elevation "D" is the field measured elevation of the top of slab before any deck concrete has been removed. This elevation will be the finished deck elevation after deck and girder repairs are complete. Elevation "N" is a field measured elevation taken on top of the new girder at the points shown with the girder in its final position. This elevation must be taken after erection is completed, but prior to placing any of the deck concrete. The girder shall not be supported between bearings when the elevations are taken.

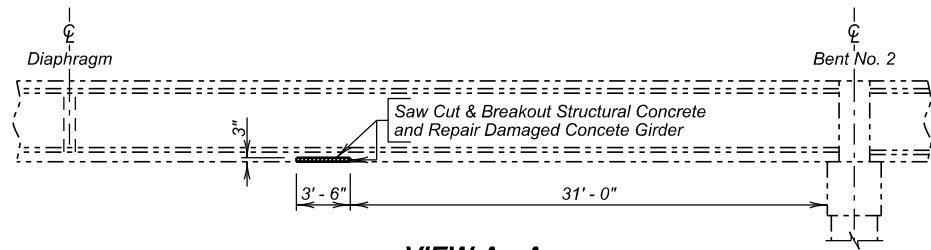
NOTE -
Based on a "d" of 10 15/16" at the C of each bent, it is anticipated that the midspan haunch dimension "h" over the C of the girder will be 1 1/4". When computing the dimensions in the table, if it is found that any dimension "h" is less than zero or greater than 4" the Office of Bridge Design of the South Dakota Dept. of Transportation shall be notified immediately. After the table of Slab Form Elevations and Calculations has been completely filled out and approved for deck forming, a copy will be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to camber growth in the beams. This information is necessary for preparing plans for future structures of this type.

(EAST BOUND LANES)
GIRDER ERECTION DATA
FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE
40' - 0" ROADWAY 35° R.H.F. SKEW
OVER S.D. HWY. NO. 38 SEC. 25-T102N-R51W
STR. NO. 50-119-166 090 E-288

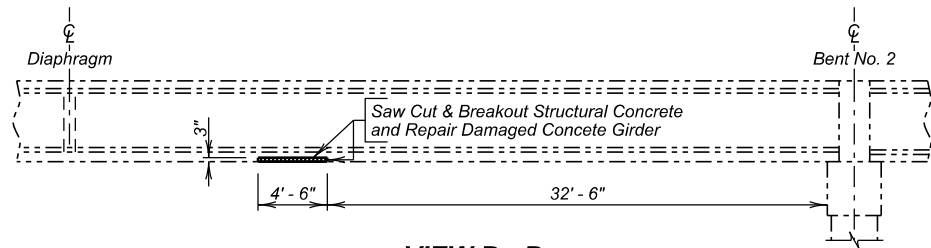
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022



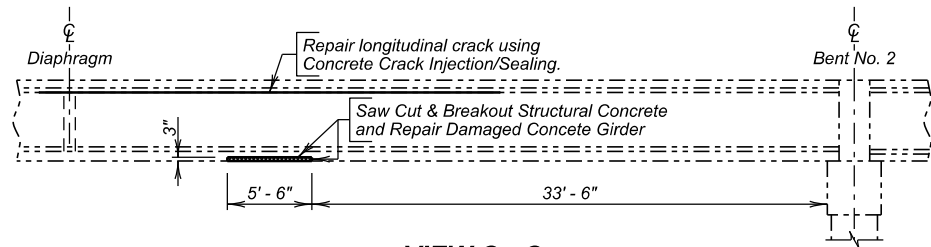
PLAN



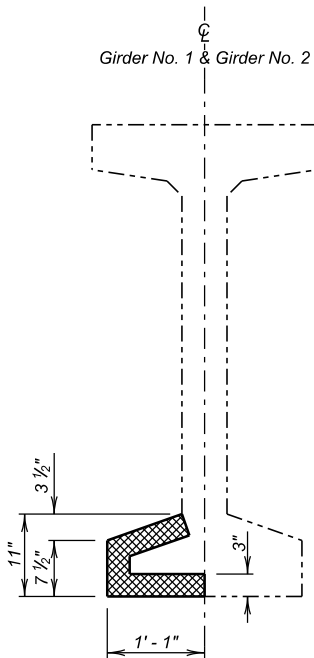
VIEW A - A
(Girder No. 1 - Elevation Repair Area)



VIEW B - B
(Girder No. 2 - Elevation Repair Area)



VIEW C - C
(Girder No. 3 - Elevation Repair Area)

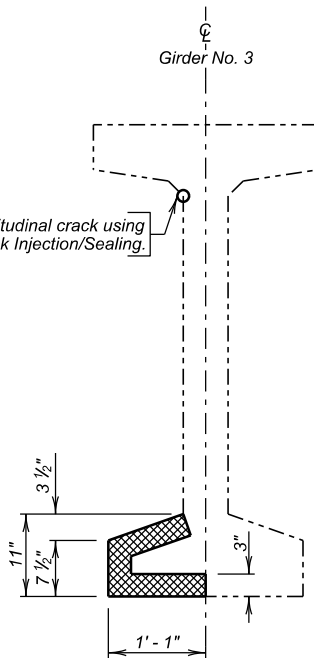


SECTION D - D

(Care will be taken to avoid additional damage to the strands)

★ Crack was .006" at the time of inspection.

★ Repair longitudinal crack using Concrete Crack Injection/Sealing.



SECTION E - E

(Care will be taken to avoid additional damage to the strands)

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete Crack Injection/Sealing	Ln	360
Prestressed Concrete Beam Repair	LS	Lump Sum

For estimating purposes an average depth of 3" was used to calculate the volume of concrete.

- Concrete Breakout 0.3 CuYd
- Patching Material 0.3 CuYd

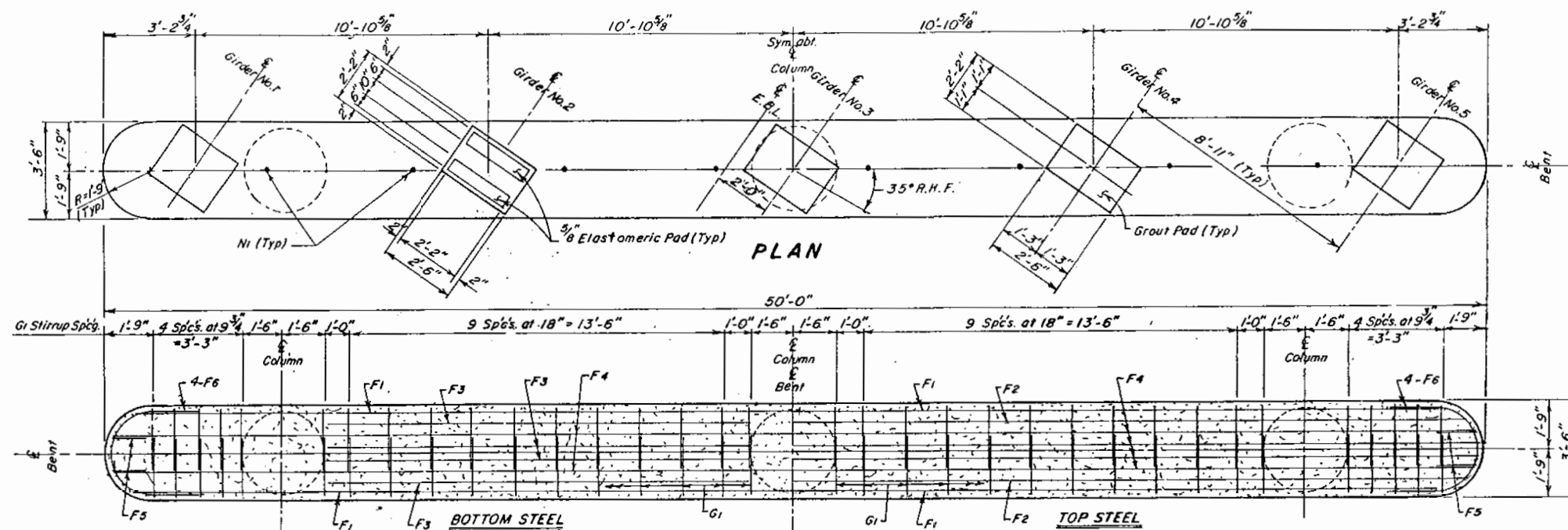
Items 1 and 2 are approximate quantities contained in the above bid item and are for information only.

(EAST BOUND LANES)
GIRDER REPAIR DETAILS

FOR
239' - 3 1/16" PRESTR. GIRDER BRIDGE

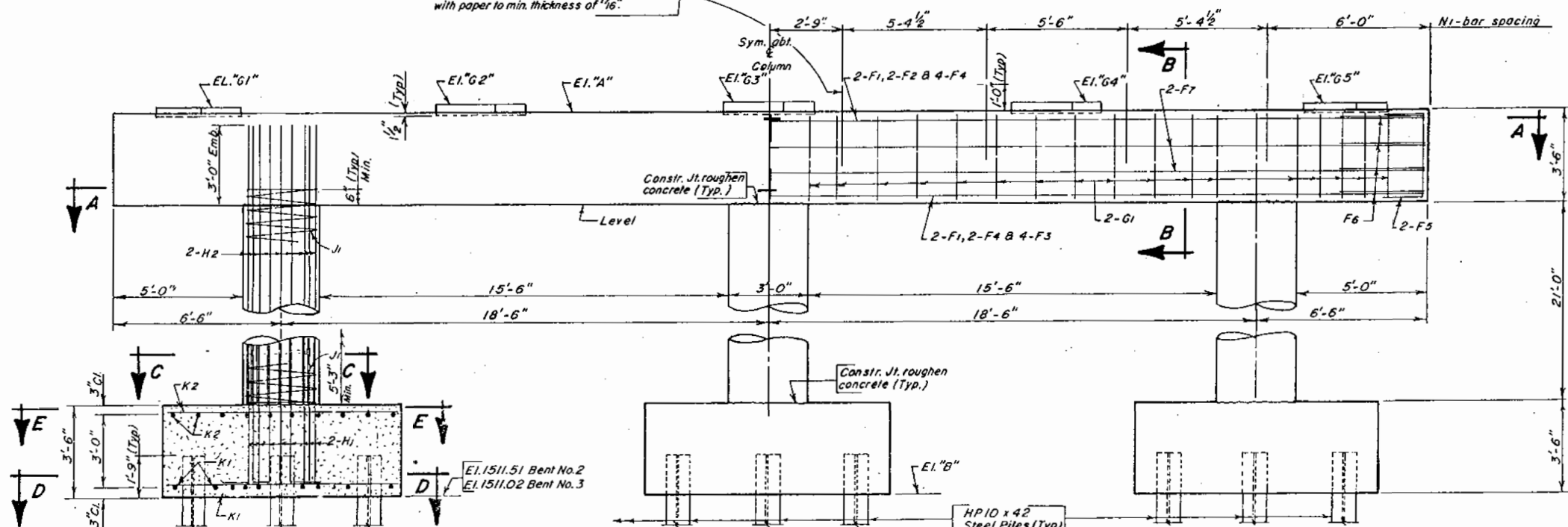
40' - 0" ROADWAY 35° R.H.F. SKEW
OVER S.D. HWY. NO. 38 SEC. 25-T102N-R51W
STR. NO. 50-119-166 090 E-288

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

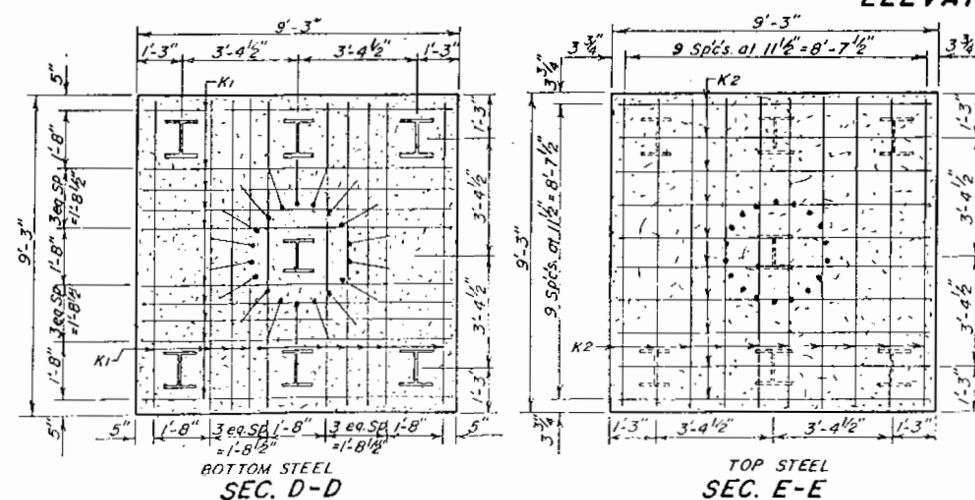


SEC. A-A

The portion of the N1 bar above the bent cap is to be coated with asphalt paint or wrapped with paper to min. thickness of 1/16".

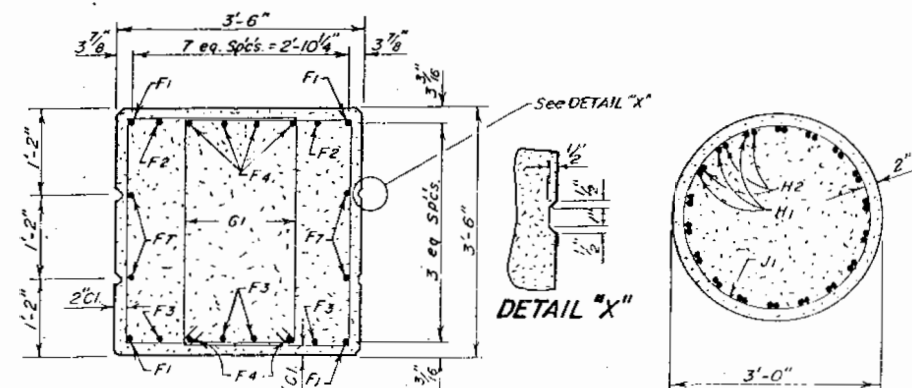


ELEVATION



BOTTOM STEEL
SEC. D-D

TOP STEEL
SEC. E-E



SEC. B-B

SEC. C-C

REINFORCING SCHEDULE
(For One Bent)

Mk	No.	Size	Length	Type
F1	4	9	47'-9"	Str.
F2	2	9	48'-9"	Str.
F3	8	9	15'-9"	Str.
F4	6	9	49'-3"	Str.
F5	4	5	6'-0"	I7
F6	8	5	7'-9"	SII
F7	4	5	47'-0"	Str.
G1	68	5	12'-0"	T1
H1	54	9	10'-3"	I7A
H2	54	9	24'-0"	Str.
J1	3	3	381'-6"	Spiral
K1	60	9	9'-0"	Str.
K2	60	4	9'-0"	Str.
N1	8	8	2'-0"	Str.

Bending Details

Type I7

Type I7A

Type T1

Spiral

Type SII

SPIRALS: Use 6" pitch and 1/2 extra turns at each end. Use 1 1/2 turns for lap at splice as required, or weld as approved by the Office of Bridge Design. Use 4 vertical spacer bars per column. Spirals may be smooth bars. Bar length shown does not include splices. All dimensions are out to out of bars.

ESTIMATED QUANTITIES			
ITEM	UNIT	QUANTITY	
		Bent No.2	Bent No.3
5" Gloss "A45" Concrete Bridge	Cu.Yd	72.5	72.5
* Reinforcement for Concrete Masonry	LB	12,703	12,703
Structure Excavation, Bridge	Cu.Yd	125	128
Furnish Steel Test Pile (HP10x A2)	Lin. Ft.	141' 33" x 33"	141' 33" x 33"
Drive Steel Test Pile (HP10x A2)	Lin. Ft.	141' 33" x 33"	141' 33" x 33"
Furnish Steel Piles (HP10x A2)	Lin. Ft.	2041' 28" x 560"	2041' 28" x 560"
Drive Steel Piles (HP10x A2)	Lin. Ft.	2041' 28" x 560"	2041' 28" x 560"

*Includes 194 lbs. for spacer bars at each bent. Each bar is computed at $\frac{3}{4}$ lbs. per lineal foot regardless of type furnished.

Bent No.	Elev. "A"	Elev. "B"	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"	Elev. "G5"
2	1539.51	1511.51	1539.80	1539.96	1540.03	1539.84	1539.63
3	1539.02	1511.02	1539.36	1539.51	1539.57	1539.36	1539.14

Elevations "G1" thru "G5" are top of grout pad elevations at centerline bent.

ORIGINAL CONSTRUCTION PLANS

(EAST BOUND LANES)

BENT DETAILS

FOR

239'-3 $\frac{1}{16}$ " PRESTRESSED GIRDER BRIDGE

40'-0" ROADWAY

3.5° R.H.F. SKEW

OVER S.D. HWY. NO.38

SEC. 25-T102N-R5IW

STA. 40+99.48 TO 43+38.74

IR90 -9 (40)390

STR. NO.50-119-166

HS 20-44

MINNEHAHA COUNTY

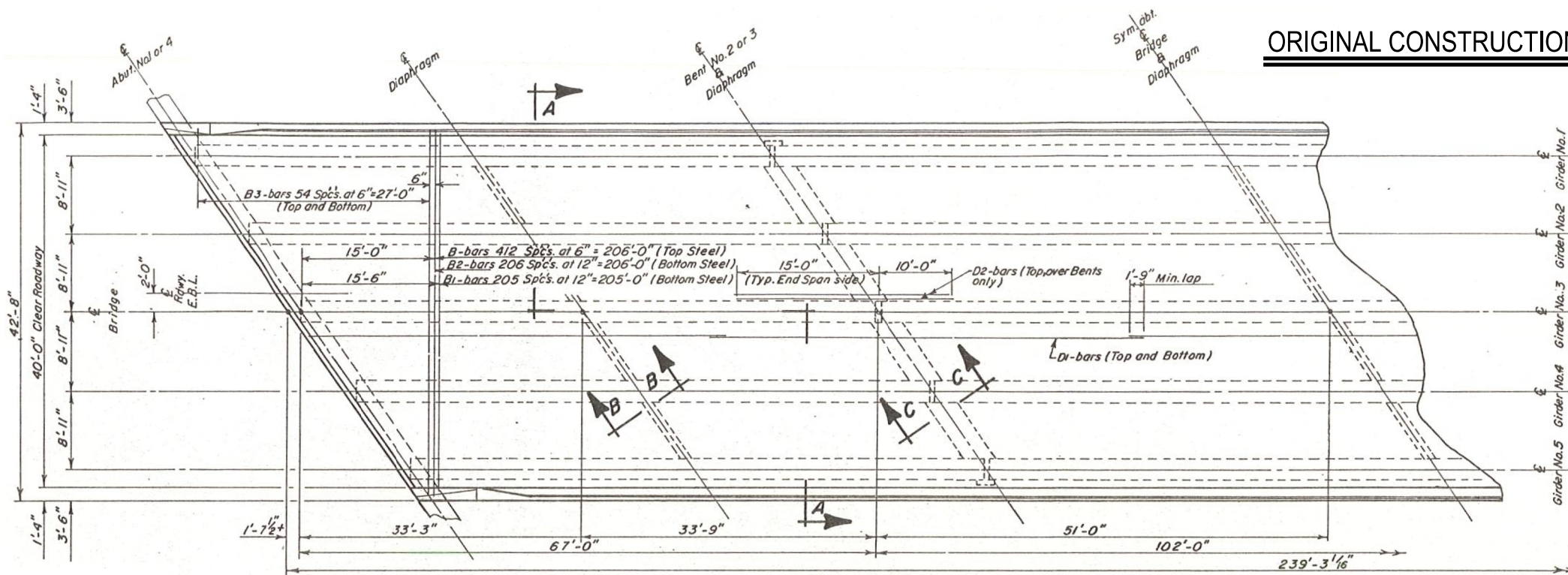
S. D. DEPT. OF TRANSPORTATION

OCT. 1987

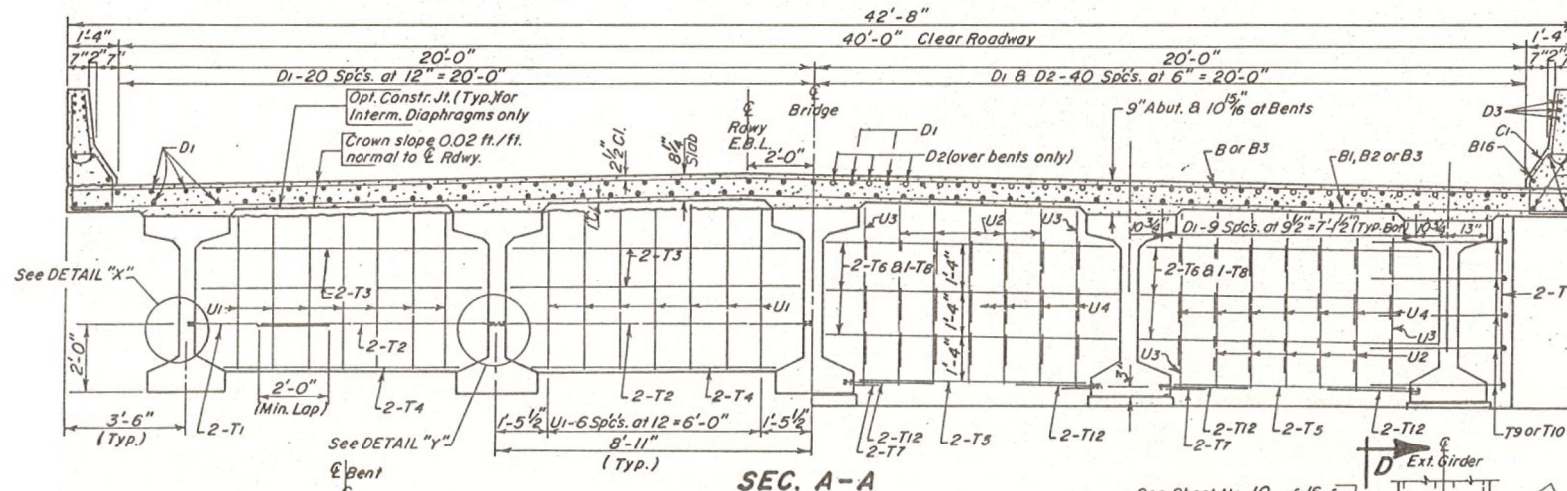
(16) OF (23)

DESIGNED BY K.G./S.J.	DRAWN BY f.o.h.	CHECKED BY S.J./K.G.	APPROVED BRIDGE ENGINEER
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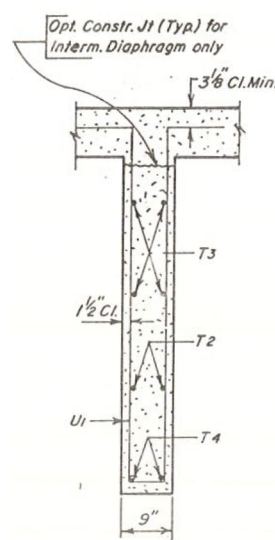
ORIGINAL CONSTRUCTION PLANS



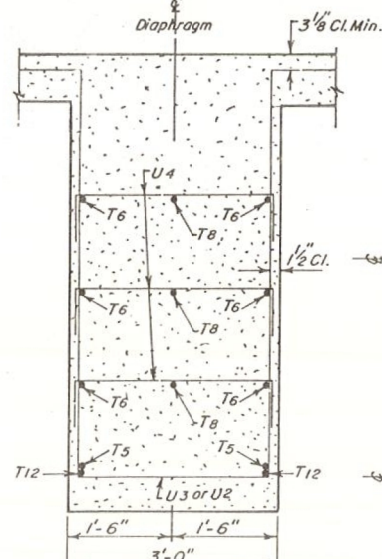
HALF PLAN



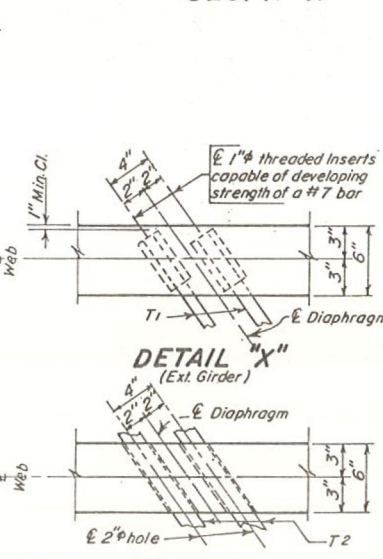
SEC. A-A



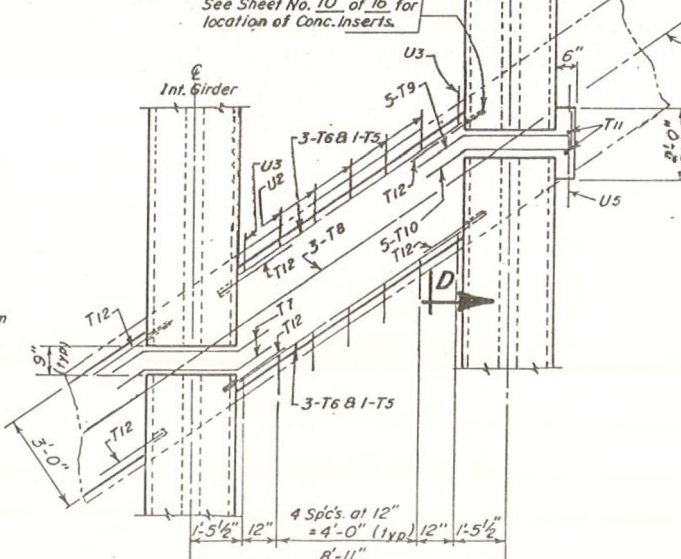
SEC. B-B



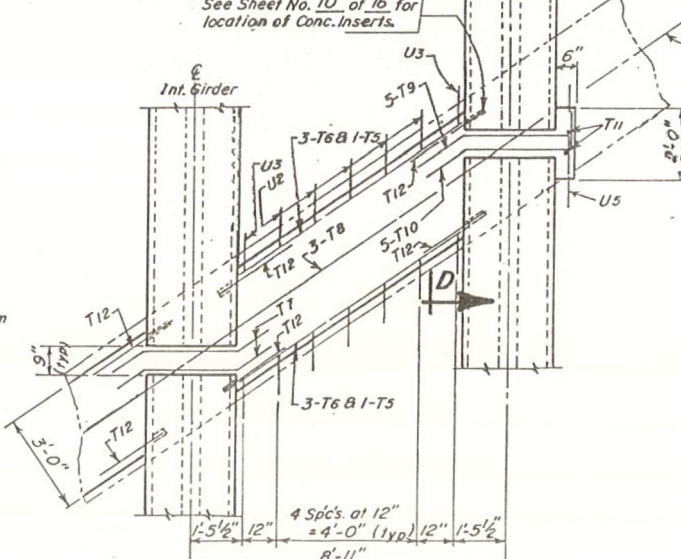
SEC. C-C



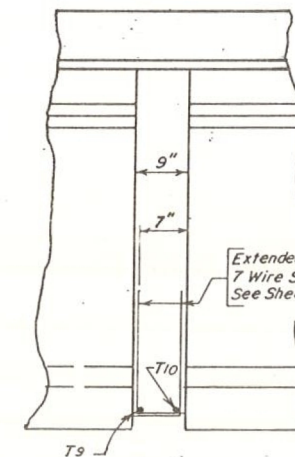
DETAIL "X"



DETAIL "Y"



BENT DIAPHRAGMS



SEC. D-D
(Showing extended strand detail)

GENERAL NOTES—

- 1-Insert T2 bars before placing final outer girder in each span.
- 2-Holes and inserts to accommodate the diaphragm bars shall be provided in the girders at locations shown on this sheet and on Sheet No. 10 of 16.
- 3-Holes which are left when the forms are removed shall be filled with mortar.
- 4-Costs of furnishing and installing 1" and 3/8" inserts shall be included in the unit price bid for the Prestressed Concrete Beams Type 63.
- 5-See Sheet No. 13 of 16 for placement of Z1 bars.
- 6-For locations and details of deck drains see Sheet No. 1 of 16.
- 7-The diaphragms, at Bents 2 and 3, and the abutment back walls shall be poured integrally with deck slab.
- 8-T1 bars shall be #8 deformed bars. Alternately #7 Richmond Threaded Dowel Bars with rolled threads to fit 1" inserts may be used.
- 9-See Sheet No. 10 of 16 for details of extended and bent 1/2" diameter 7 wire strands.

NOTE—

Concrete shall be placed in the space under the beams (within the diaphragm width) during the diaphragm pour. Care shall be taken to get the concrete vibrated into this area. If upon form removal the space is not completely filled and consolidated, the Contractor shall grout in the remaining voids.

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
ΔB	413	5	42'-4"	Str.	Type 17A
ΔB1	206	5	36'-8"	Str.	
ΔB2	207	4	42'-4"	Str.	Type 17A
ΔB3	110	5	45'-3"	Str.	
ΔB15	12	5	14'-3"	Str.	Type 17A
ΔB16	10	4	47'-6"	Str.	
ΔB17	8	4	8'-6"	19B	Type 17A
ΔB18	6	8	4'-3"	19B	
ΔB19	6	5	2'-4"	Str.	Type 17A
ΔB20	6	6	3'-2"	17A	
ΔB21	8	8	6'-0"	Str.	Type 17A
ΔC1	470	5	5'-10"	T2A	
ΔC2	432	5	5'-1"	S11	Type 17A
ΔC3	2	5	6'-4"	T1	
ΔC4	2	5	6'-5"	T1	Type 17A
ΔC5	4	5	6'-7"	T1	
ΔC6	2	5	6'-8"	T1	Type 17A
ΔC7	4	5	6'-9"	T1	
ΔC8	2	5	6'-11"	T1	Type 17A
ΔC9	4	5	7'-0"	T1	
ΔC10	8	6	6'-0"	T2A	Type 17A
ΔC11	8	5	7'-1"	T1	
ΔC12	2	6	4'-9"	17	Type 17A
ΔC13	2	5	5'-3"	17	
ΔC14	2	5	7'-3"	T1	Type 17A
ΔC15	2	5	7'-6"	T1	
ΔD1	455	5	49'-0"	Str.	Type 17A
ΔD2	80	6	25'-0"	Str.	
ΔD3	60	4	44'-5"	Str.	Type 17A
T1	12	8	4'-0"	Str.	
T2	6	7	39'-11"	Str.	Type 17A
T3	48	4	10'-0"	Str.	
T4	24	5	8'-3"	Str.	Type 17A
T5	16	6	8'-0"	Str.	
T6	48	5	10'-0"	Str.	Type 17A
T7	12	5	4'-9"	19	
T8	6	6	46'-1"	Str.	Type 17A
T9	20	5	4'-10"	17B	
T10	20	5	4'-10"	17B	Type 17A
T11	8	5	5'-3"	Str.	
T12	32	6	2'-6"	Str.	Type 17A
ΔU1	84	4	12'-3"	S4	
ΔU2	40	4	16'-6"	S4	Type 17A
ΔU3	16	6	17'-0"	S4	
ΔU4	168	4	4'-8"	17A	Type 17A
ΔU5	4	6	15'-4"	S4	
ΔZ1	108	7	4'-0"	Str.	Type 17A
ΔC16	14	5	7'-9"	T1	

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
* Class "A" Concrete Bridge Deck	Cu. Yd.	485.1
* Reinforcement for Concrete Masonry	Lb.	2679
* Epoxy Coated Reinforcement for Concrete Masonry	Lb.	74,805
* Prest. Concrete Beam Type 63 (10'1" x 3')	Each	9
* Prest. Concrete Beam Type 63 (16'6" x 8')	Each	10
* Deck Drains (Bent Bridge)	Each	8

* Includes quantities for Diaphragms, Barrier Curbs, Abut. Backwalls and Slab.
 † Includes quantities for Diaphragms, Barrier Curbs and Slab.

(EAST BOUND LANES) SUPERSTRUCTURE DETAILS

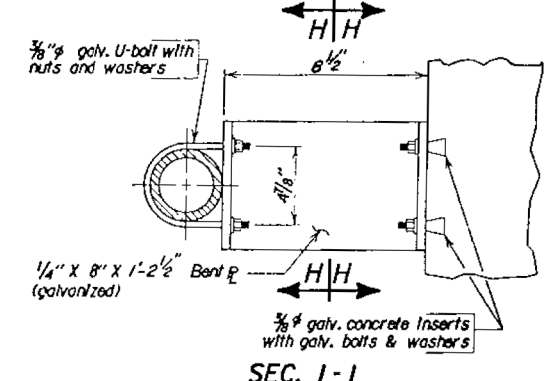
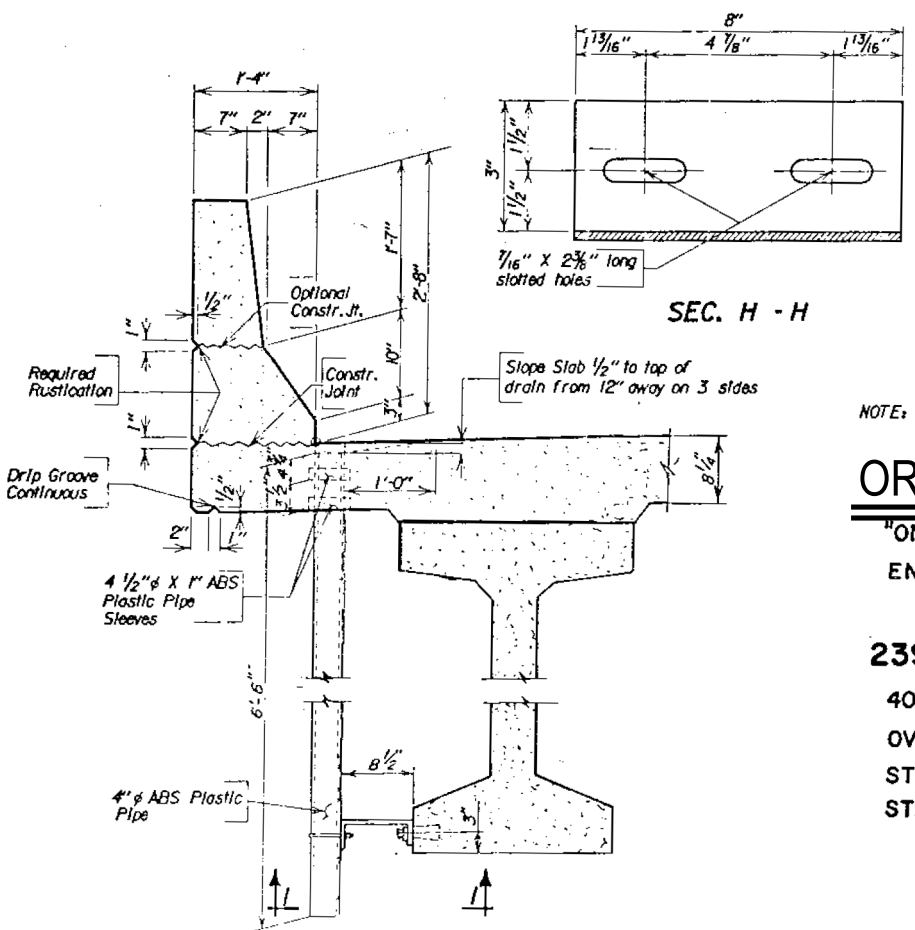
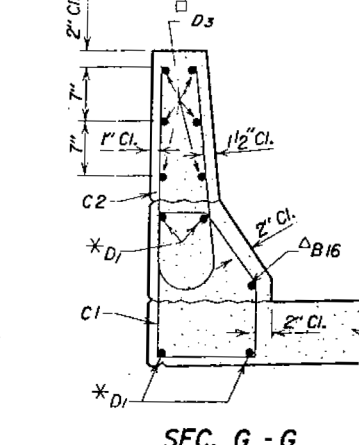
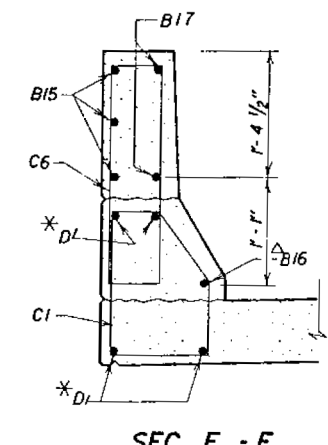
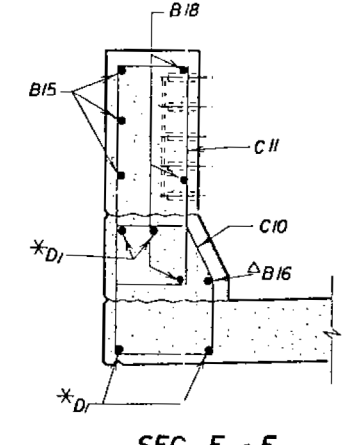
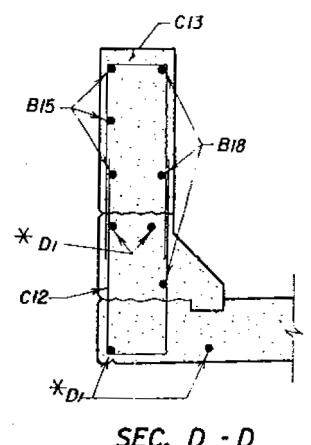
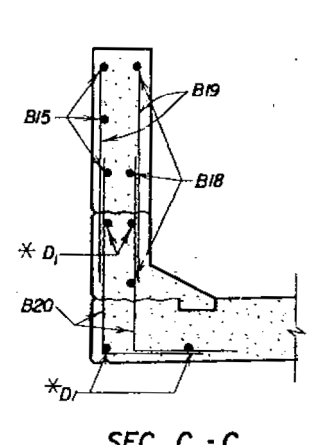
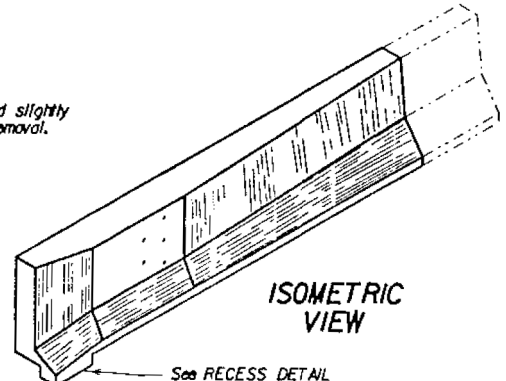
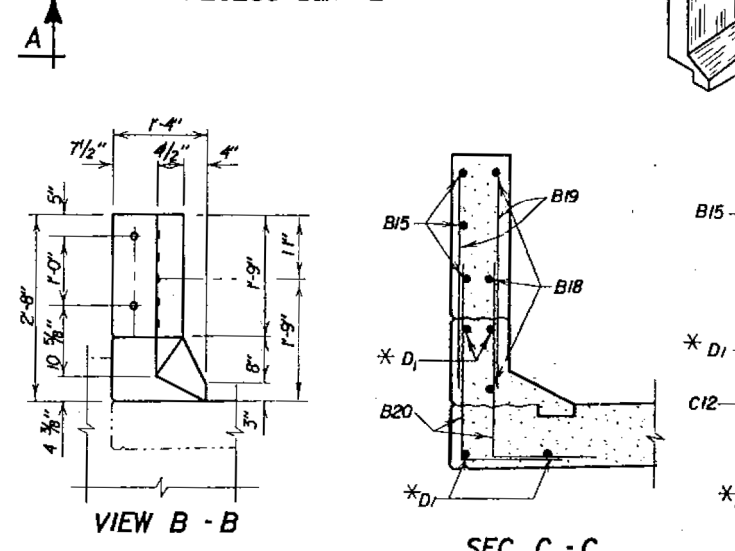
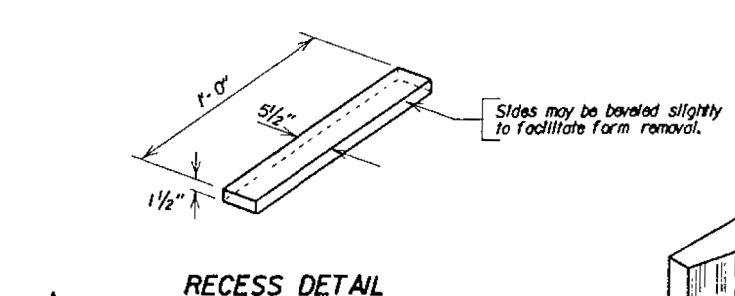
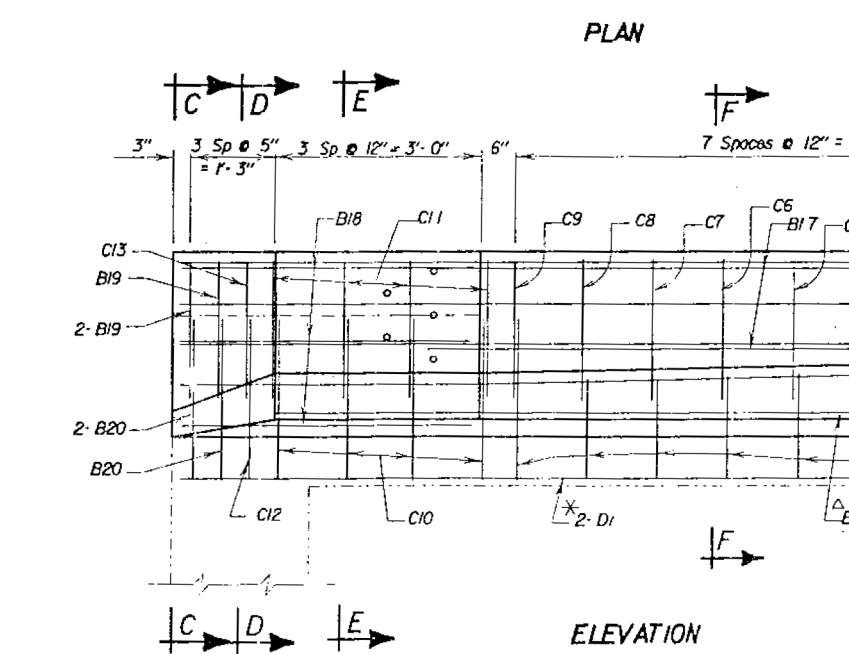
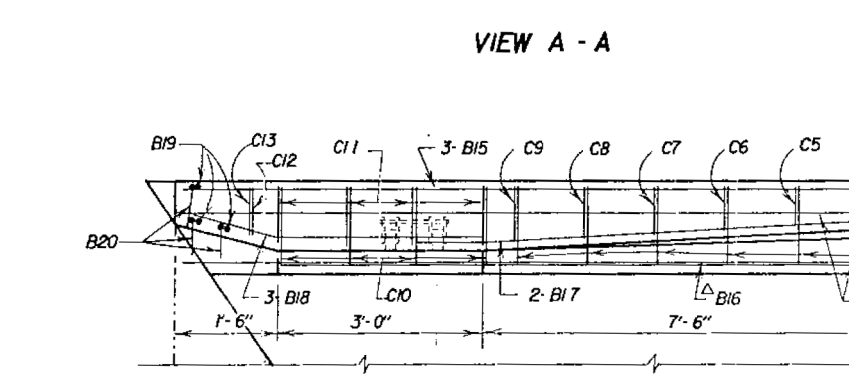
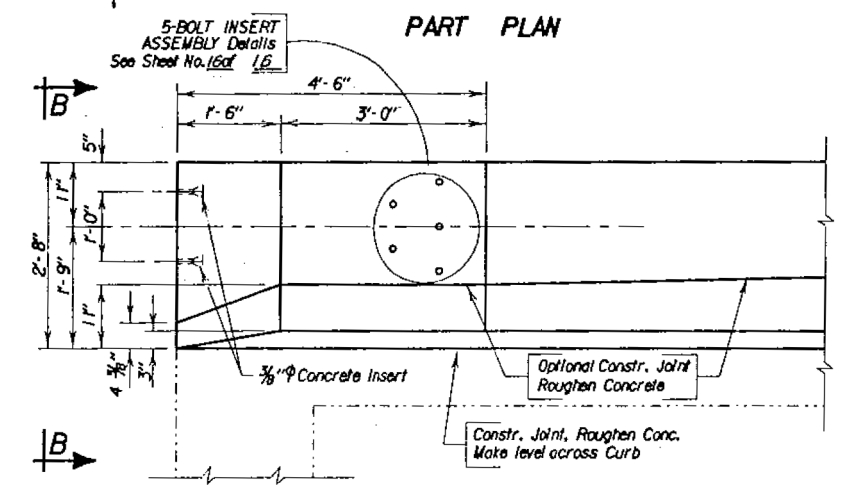
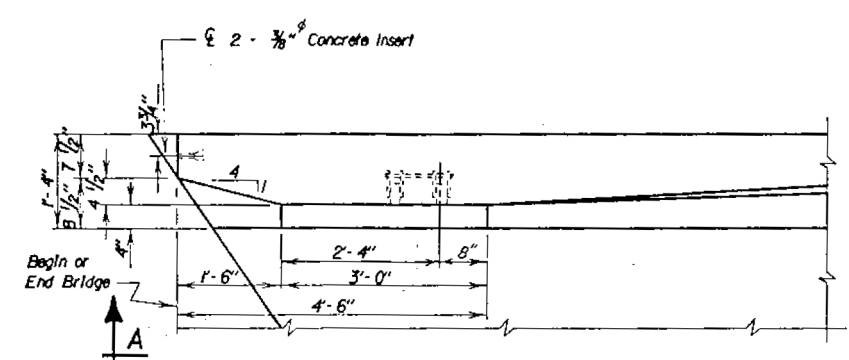
239'-3 1/16" PRESTRESSED GIRDER BRIDGE
 40'-0" ROADWAY
 OVER S.D. HWY. NO. 38
 STA. 40+99.48 TO 43+38.74
 STR. NO. 50-119-166

35° R.H.F. SKEW
SEC. 25-T102N-R51W
IR90-9 (40) 390
HS20-44
(& ALT.)

MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION

OCT. 1987

DESIGNED BY K.G. / S.J.	DRAWN BY F.A.T.	CHECKED BY K.G. / S.J.	APPROVED BRIDGE ENGINEER
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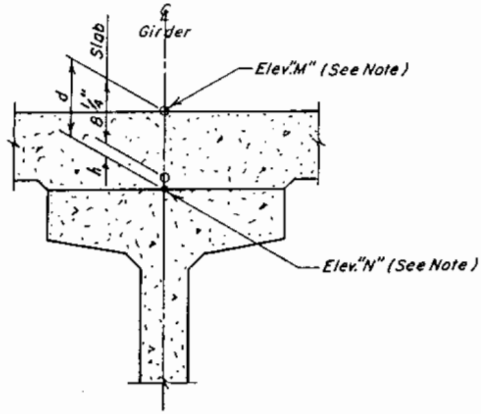
- GENERAL NOTES -**
1. Use 1/2" Clear Cover on all bars except as shown.
 2. Reinforcing Steel shall conform to ASTM - A615, Grade 60.
 3. End Blocks shall be built normal to grade.
 4. The Cost of the 5-Bolt Insert Assembly complete in place including welding and galvanizing shall be absorbed in the unit price bid for "Class 'A45' Concrete Bridge Deck."
 5. 3/8" Concrete Inserts shall be internally threaded for use with a standard machine bolt and shall be of such design that when installed in the concrete it will be capable of sustaining an ultimate load in tension of 2,500 pounds. The inserts shall either be galvanized or made of a corrosion resistant material. The cost of furnishing and installing the insert shall be absorbed in the unit price bid for Reinforcing Steel except the inserts placed in the beams for attachment of deck drain supports shall be included in the unit price bid for Prestressed Concrete Beams.

ORIGINAL CONSTRUCTION PLANS

"ON END" (EAST BOUND LANES)
 END BLOCK, BARRIER CURB AND DRAIN DETAILS
 FOR
239'-3 1/16" PRESTRESSED GIRDER BRIDGE
 40'-0" ROADWAY 35° R.H.F. SKEW
 OVER S.D. HWY. NO. 38 SEC. 25-T102N-R51W
 STA. 40+99.48 TO 43+38.74 IR 90-9 (40) 390
 STR. NO. 50-119-166 HS 20-44 (& ALT.)
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
K. G. / S. J.	K. G. / S. J.	K. G. / S. J.	K. G. / S. J.
BRIDGE ENGINEER			

NOTE -
 For listing of re-bars See Reinforcing
 Schedule Sheet No. 8 of 25



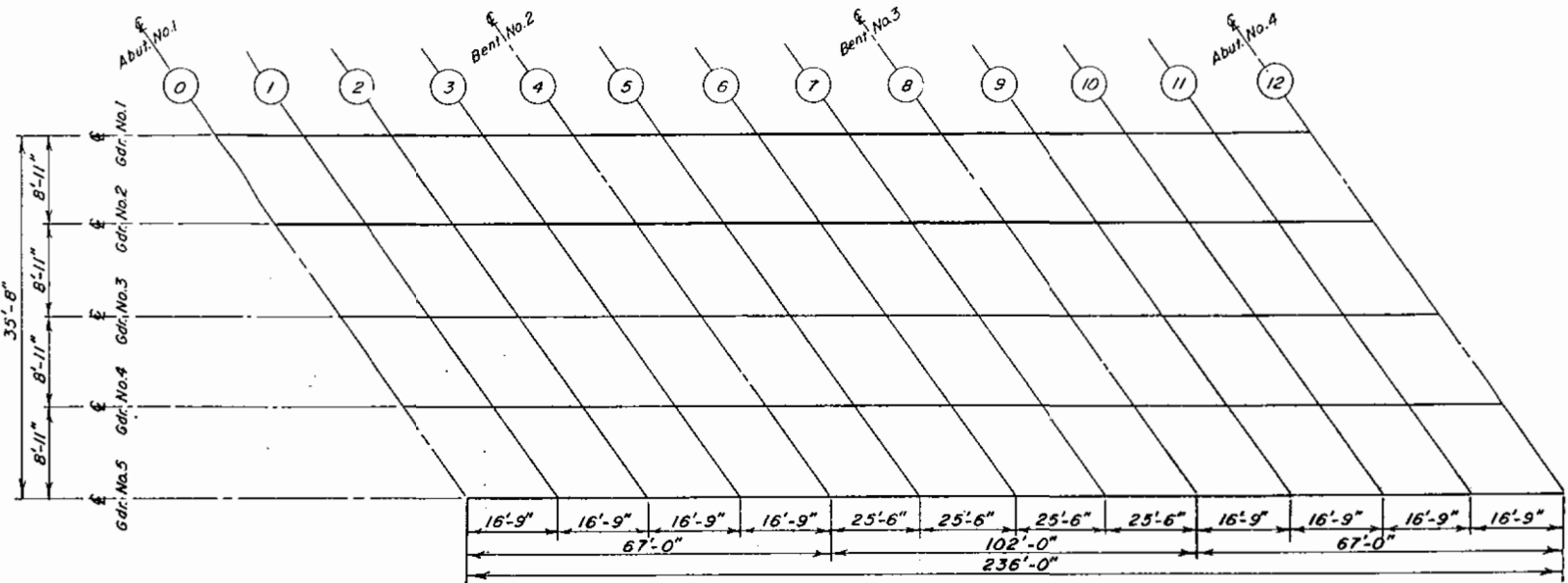
NOTE —

The table contains the information necessary to determine the depth of concrete over the girders at points shown. Calculations may be carried in the space provided. Elev. "M" is the design elevations at top of slab before any concrete has been poured. This elevation includes correction for camber and dead load deflection. Elev. "N" is a field measured elevation taken on top of girders at the points shown with the girders in their positions. This elevation must be taken after erection is completed, but prior to placing any of the concrete. Girders shall not be supported between bearings when elevations are taken.

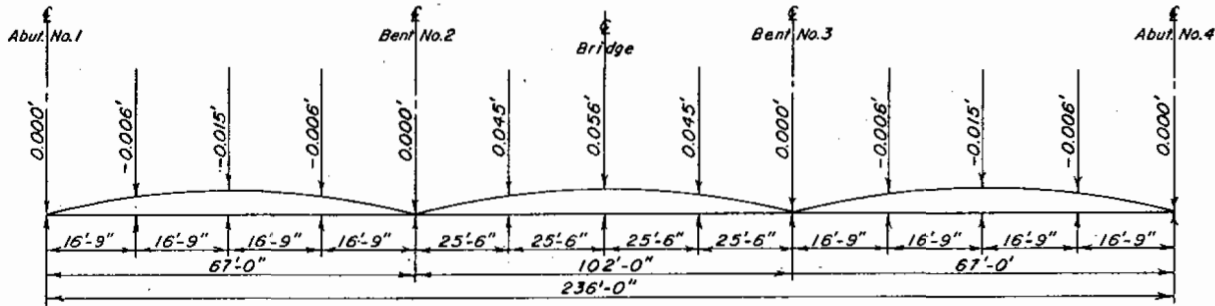
NOTE —

Based on a "d" of 9" at the E of each abutment and 10 1/8" at the E of each bent (See Sec. A-A on Sheet No. 7 of 16), it is anticipated that the midspan haunch dimension "h" over the E of each girder will be 1/4". If when computing the dimensions in the table, it is found that any dimension "h" is less than zero or greater than 2 3/4", the Office of Bridge Design of the South Dakota Department of Transportation must be notified immediately.

After the "Table of Slab Form Elevations and Calculations" has been completely filled out and approved for deck forming, a copy must be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to camber growth in the beams. This information is necessary for preparing plans for future structures of this type.



GIRDER LAYOUT



CAMBER DIAGRAM

The Camber shown above is the amount which has been added to the theoretical slab elevations to get slab elevations shown in the table below.

Camber shown is for D. L. of slab, traffic barrier, diaphragms and camber growth but does not include D. L. of beams.

TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS														
		0	1	2	3	4	5	6	7	8	9	10	11	12
Girder No. 1	Elev. "M"	1546.169	1546.133	1546.088	1546.055	1546.012	1545.971	1545.881	1545.754	1545.578	1545.479	1545.370	1545.272	1545.165
	(-) Elev. "N"													
	(-) d													
	(-) 0.688'													
	(-) h													
Girder No. 2	Elev. "M"	1546.337	1546.299	1546.252	1546.216	1546.171	1546.126	1546.032	1545.902	1545.722	1545.620	1545.509	1545.409	1545.300
	(-) Elev. "N"													
	(-) d													
	(-) 0.688'													
	(-) h													
Girder No. 3	Elev. "M"	1546.424	1546.384	1546.334	1546.296	1546.248	1546.200	1546.102	1545.968	1545.786	1545.681	1545.567	1545.465	1545.354
	(-) Elev. "N"													
	(-) d													
	(-) 0.688'													
	(-) h													
Girder No. 4	Elev. "M"	1546.234	1546.191	1546.139	1546.098	1546.049	1545.996	1545.895	1545.758	1545.571	1545.465	1545.349	1545.244	1545.130
	(-) Elev. "N"													
	(-) d													
	(-) 0.688'													
	(-) h													
Girder No. 5	Elev. "M"	1546.042	1545.997	1545.943	1545.900	1545.848	1545.792	1545.687	1545.546	1545.356	1545.247	1545.128	1545.022	1544.905
	(-) Elev. "N"													
	(-) d													
	(-) 0.688'													
	(-) h													

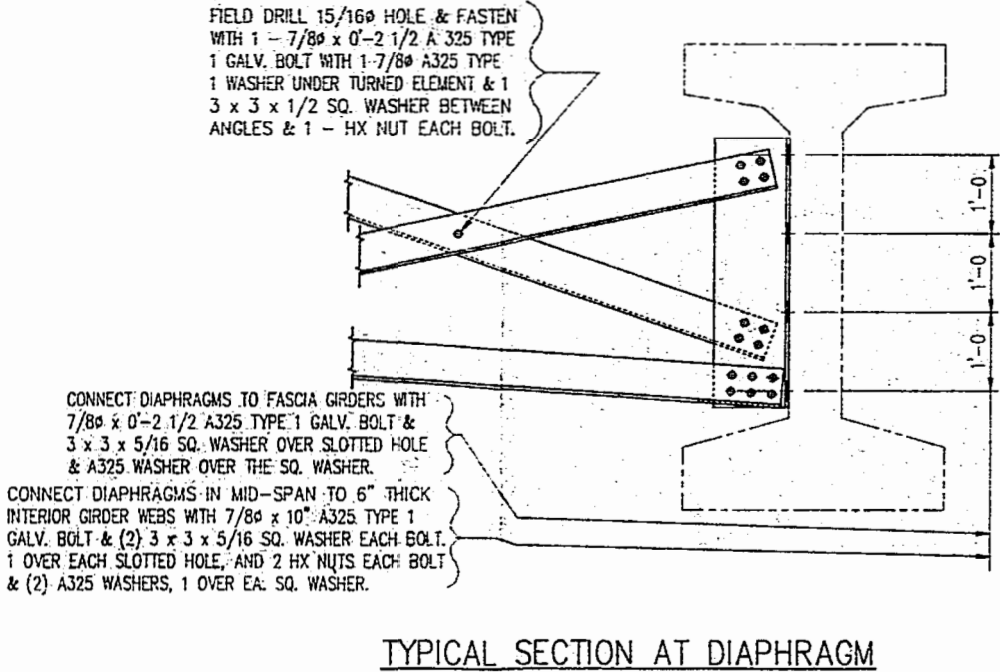
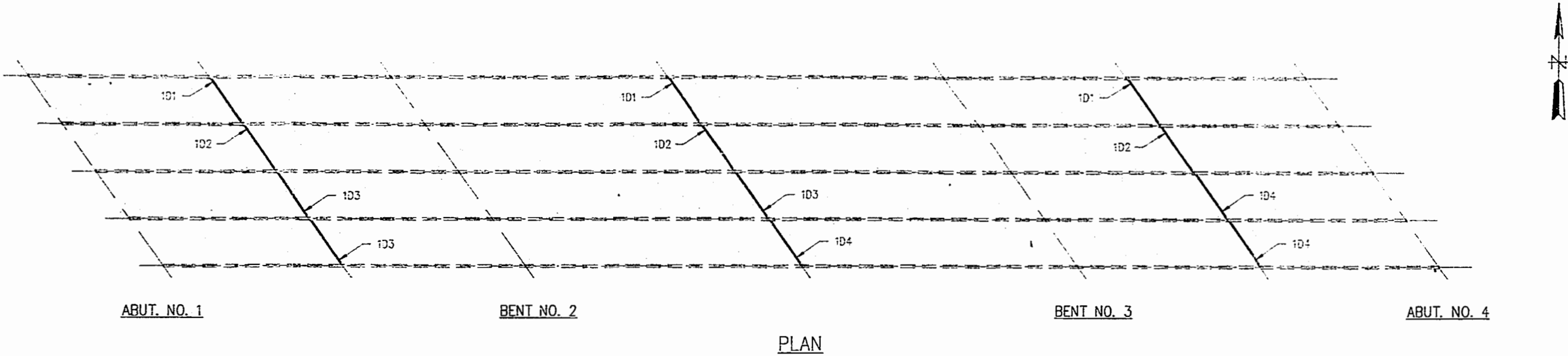
ORIGINAL CONSTRUCTION PLANS

(EAST BOUND LANES)
ERECTION DATA
FOR
239'-3 1/16" PRESTRESSED GIRDER BRIDGE
40'-0" ROADWAY 35° R.H.F. SKEW
OVER S.D. HWY. NO. 38 SEC. 25-T102N-R51W
STA. 40+99.48 TO 43+38.74 IR90-9 (40) 390
STR. NO. 50-119-166 HS20-44
(8 ALT.)

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCT. 1987


DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
M.G./S.J.	Lok	S.J./K.G.	
BRIDGE ENGINEER			

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	38	48

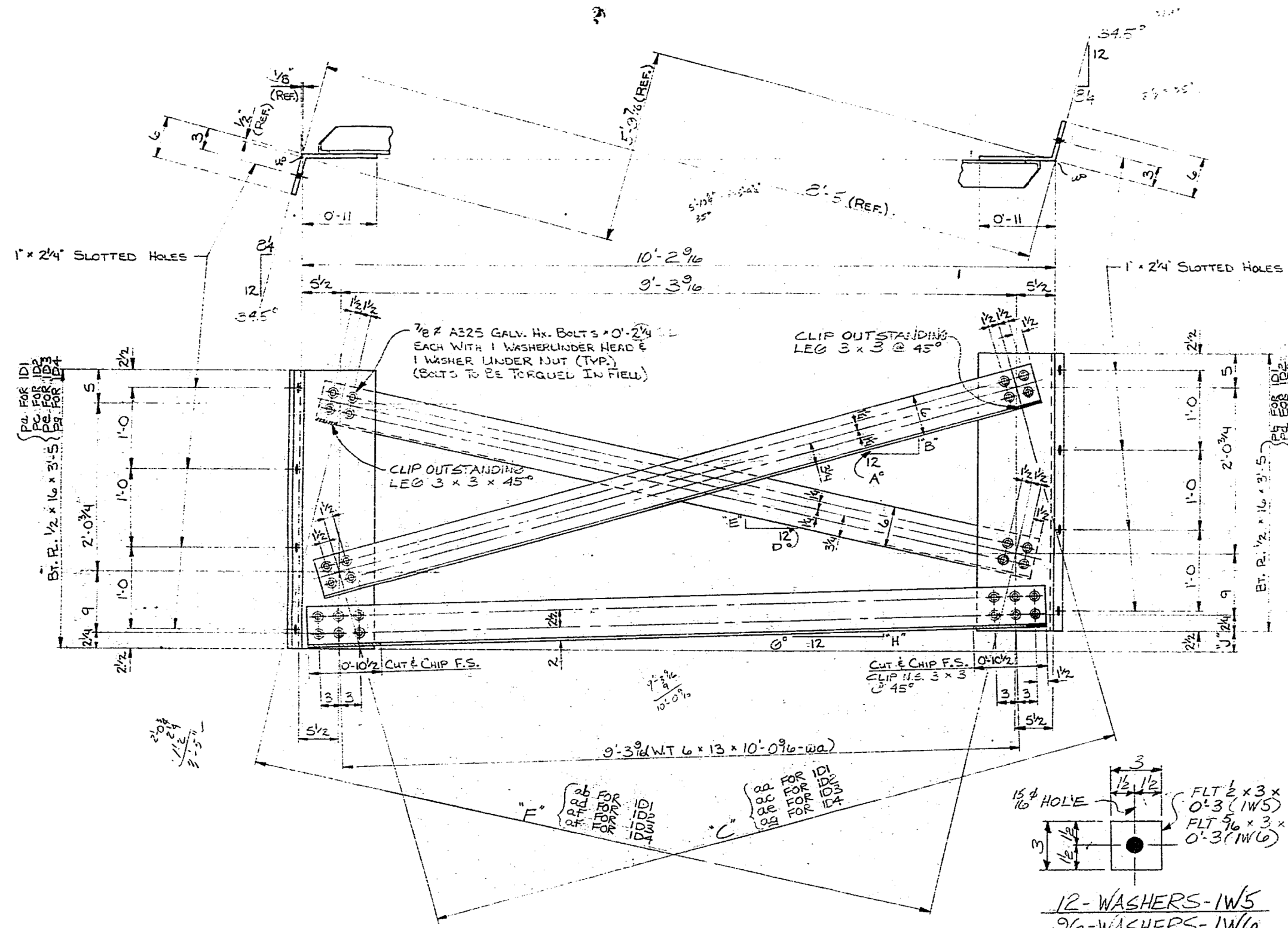


ORIGINAL CONSTRUCTION PLANS

SEE DETAIL SHEET FOR GENERAL NOTES.

		LEWIS ENGINEERING COMPANY	
5229 EDEN AVENUE-EDINA, MINNESOTA 55436-(612)920-8161		Drawn By TU	
PROJECT — STR. 50-119-166		Chk'd By JD✓	
STATE PROJECT — HS20-44		Date: 3-20-89	
FEDERAL PROJECT — IR90-9(40)390			
CUSTOMER — GRAVES BROS. INC.			
LOCATION — MINNEHAHA CO., S.D.			
DESCRIPTION — DIAPHRAGM ERECTION PLAN		(21) OF (23)	
LEC. NO. E1 OF 2		SHEET NO. E1 OF 1	
		Job. No. : 3243-35	

STR. NO. 50-119-166



LINE NO.	DESCRIPTION	LENGTH FT. INCH	MK	REMARKS	WGHT.
1					
2	3-DIAPHRAGMS - ID1				
3	BT. R. 1/2 x 16	3 5	ea		
4	BT. R. 1/2 x 16	3 5	ea		
5	LG x 4 x 5/16	10 0 1/2	ea		
6	LG x 4 x 5/16	3 11 3/4	ea		
7	WT 6 x 13	10 0 9/16	ea		
8	HX BLT 3/8 A325 G	0 2 1/4	ea		
9	FW 3/8 A325 G		ea		
10	HN 3/8 A325 G		ea		
11					
12	3-DIAPHRAGMS - ID2				
13	BT. R. 1/2 x 16	3 5	ea		
14	BT. R. 1/2 x 16	3 5	ea		
15	LG x 4 x 5/16	10 0 1/2	ea		
16	LG x 4 x 5/16	10 0 1/2	ea		
17	WT 6 x 13	10 0 9/16	ea		
18	HX BLT 3/8 A325 G	0 2 1/4	ea		
19	FW 3/8 A325 G		ea		
20	HN 3/8 A325 G		ea		
21					
22	3-DIAPHRAGMS - ID3				
23	BT. R. 1/2 x 16	3 5	ea		
24	BT. R. 1/2 x 16	3 5	ea		
25	LG x 4 x 5/16	10 0 1/2	ea		
26	LG x 4 x 5/16	9 11 3/4	ea		
27	WT 6 x 13	10 0 9/16	ea		
28	HX BLT 3/8 A325 G	0 2 1/4	ea		
29	FW 3/8 A325 G		ea		
30	HN 3/8 A325 G		ea		
31					
32	3-DIAPHRAGMS - ID4				
33	BT. R. 1/2 x 16	3 5	ea		
34	BT. R. 1/2 x 16	3 5	ea		
35	LG x 4 x 5/16	10 0 1/2	ea		
36	LG x 4 x 5/16	9 11 3/4	ea		
37	WT 6 x 13	10 0 9/16	ea		
38	HX BLT 3/8 A325 G	0 2 1/4	ea		
39	FW 3/8 A325 G		ea		
40	HN 3/8 A325 G		ea		
41					
42	12-WASHERS - IW5				
43	12 FLT 1/2 x 3	0 3	IW5		
44	96-WASHERS - IW6				
45	96 FLT 5/8 x 3	0 3	IW6		
46					
47	FIELD BOLTS				
48	13 HX BLT 3/8 A325 G	0 2 1/2	IW7		
49	13 HN 3/8 A325 G		IW8		
50	13 FW 3/8 A325 G		IW9		
51					
52	25 HX BLT 3/8 A325 G	0 2 1/2	IW10		
53	38 HX BLT 3/8 A325 G	0 10	IW11 1/4" MIN. THRD		
54	75 HN 3/8 A325 G		IW12		
55	100 FW 3/8 A325 G		IW13		
56					
57	GENERAL NOTES				
58	1) ALL HOLES TO BE 1/16" DIA. UNLESS NOTED.				
59	2) WORKMANSHIP & MATERIALS PER SD/DOT STD. SPECS.				
60	FOR CONSTRUCTION - 1995 EDITION & SPECIAL PROVISIONS.				
61	3) ALL STEEL PER ASTM A36.				
62	4) GALV. P.S. ANGLES & SHAPES PER ASTM A123 AFTER FAB. &				
63	PRIOR TO ASSEMBLY GALV. HARDWARE PER ASTM A153.				

- 3 - DIAPHRAGMS - ID1
- 3 - DIAPHRAGMS - ID2
- 3 - DIAPHRAGMS - ID3
- 3 - DIAPHRAGMS - ID4

STR. NO. 50-119-166

ORIGINAL CONSTRUCTION PLANS

MARK	QTY	ANGLE DIM.	ANGLE DIM.							
		A°	B°	C°	D°	E°	F°	G°	H°	J°
ID1	3	134.2°	2 3/4	9° 6' 16"	11.50°	2 1/2	9° 5' 3"	0.06°	3/16	1 1/8
ID2	3	12.89°	2 3/4	9° 6' 16"	12.13°	2 9/16	9° 6' 8"	0.36°	1/16	3/4
ID3	3	13.65°	2 1/2	9° 6' 16"	11.36°	2 1/6	9° 5' 3"	1.22°	1/4	2 3/8
ID4	3	13.78°	2 1/2	9° 6' 8"	11.23°	2 3/8	9° 5' 3"	1.35°	5/16	2 3/8

LEWIS ENGINEERING COMPANY
5229 EDEN AVENUE - EDINA, MINNESOTA 55436 - (612) 920-8161

PROJECT - STR. 50-119-166

STATE PROJECT - HS20-44

FEDERAL PROJECT - I R 90-9(40) 390

CUSTOMER - GRAVES BROS, INC.

LOCATION - MINNEHAHA CO, S.D.

DESCRIPTION - DIAPHRAGMS FOR 63" BEAM

Job No. 3242-35

Drawn By: J.U.

Checked By: J.U.

Date: 3-20-89

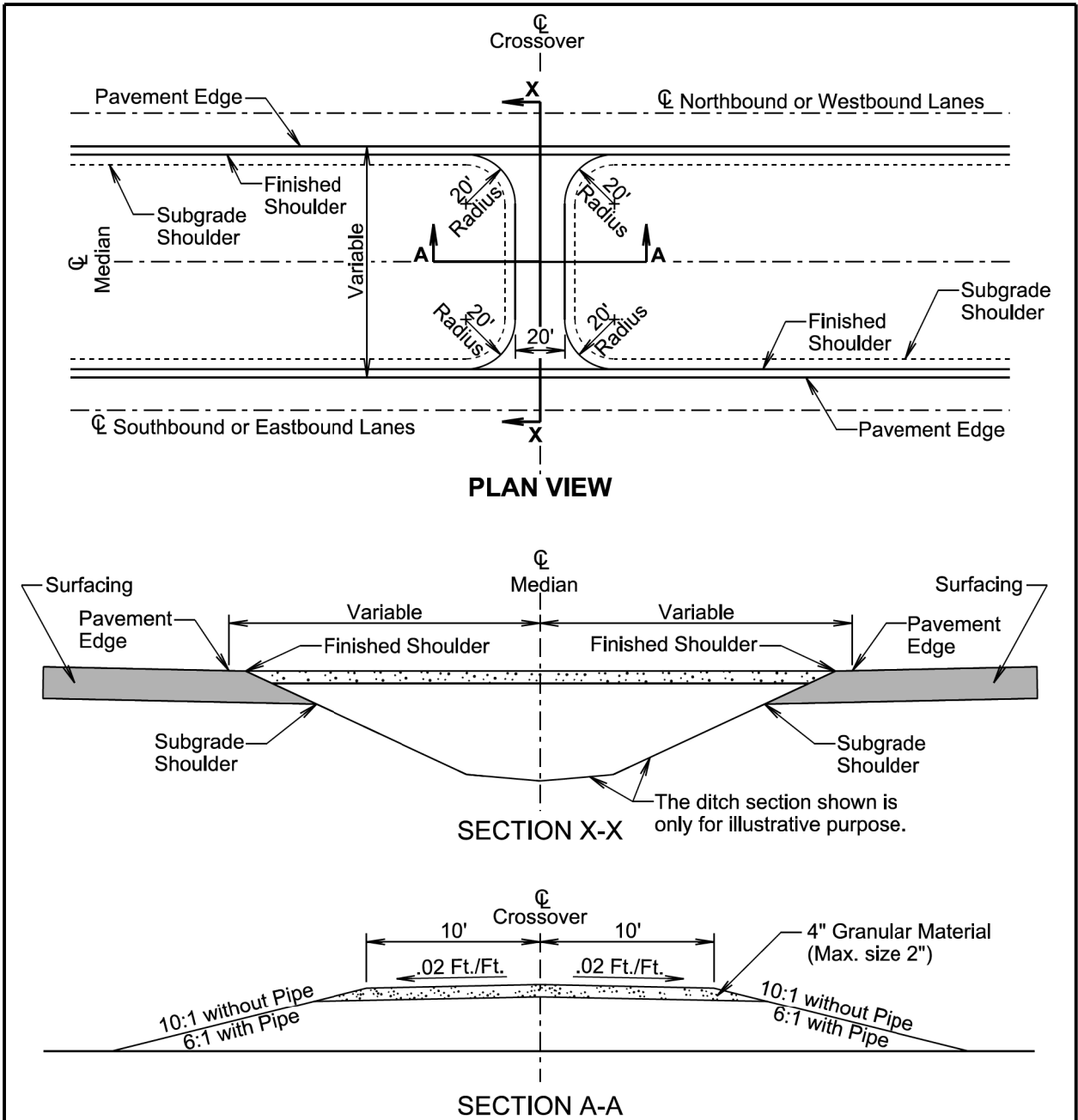
22 OF 23

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Plot Scale -

TRSF12114
-Plotted From -

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	41	48

Plotting Date: 01/04/2021



GENERAL NOTES:

The inslopes of the maintenance crossovers will be 6:1 when there is a pipe, 10:1 without pipe, or as specified in the plans.

The quantities of materials necessary for construction of the maintenance crossovers are as provided in the plans and will be paid for at their respective contract unit prices for the various materials used.

September 14, 2018

Published Date: 4th Qtr. 2022	S D O T	STANDARD MAINTENANCE CROSSOVER FOR INTERSTATE HIGHWAYS	PLATE NUMBER 120.04
			Sheet 1 of 1

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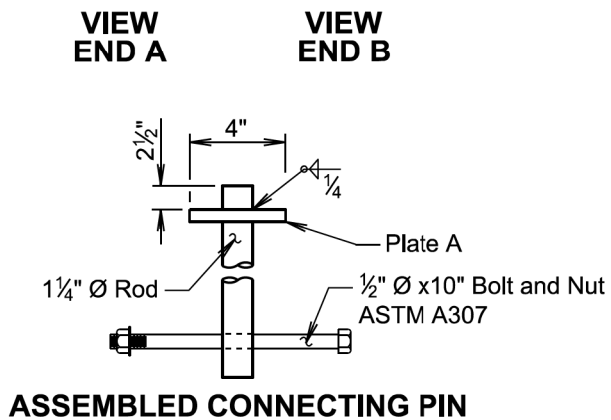
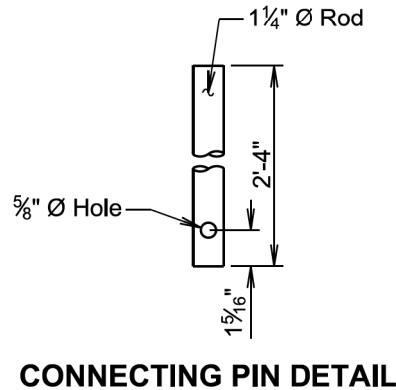
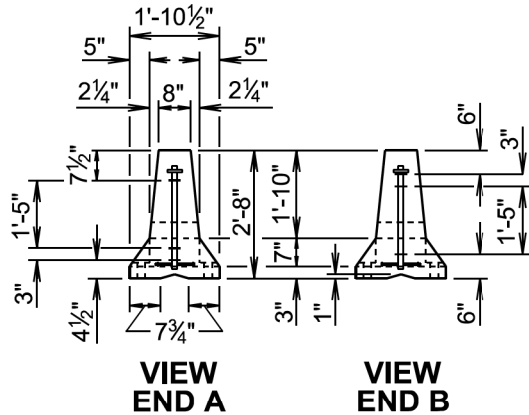
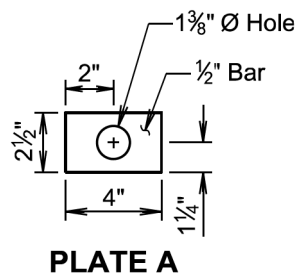
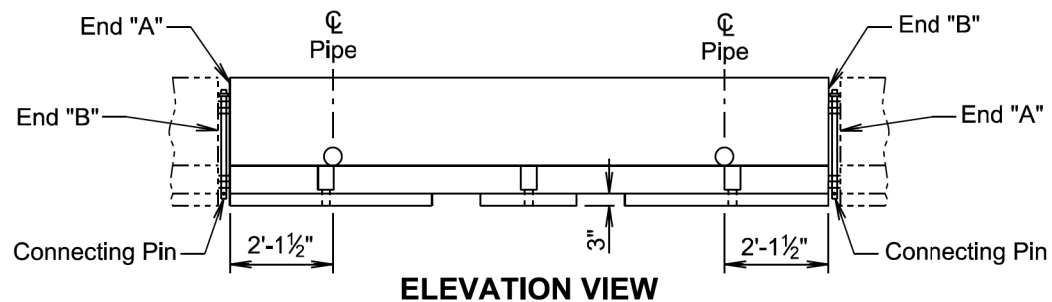
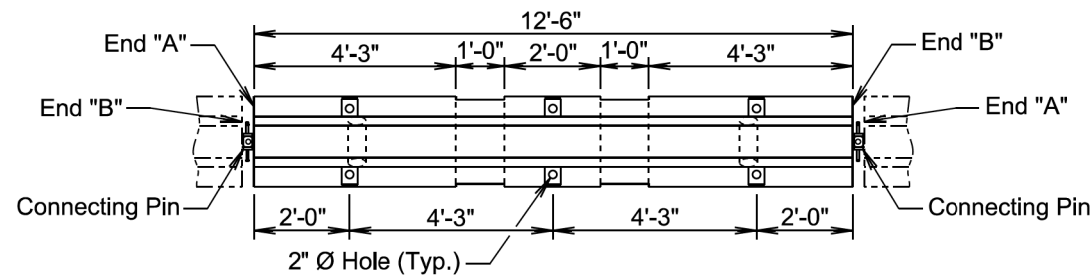
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TRSE12114

-Plotted From -

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	42	48

Plotting Date: 01/04/2021



September 14, 2018

Published Date: 4th Qtr. 2022	S D D O T	TRAFFIC CONTROL MOVABLE CONCRETE BARRIERS (F SHAPE INTERIOR SECTION)	PLATE NUMBER 628.01
			Sheet 1 of 2

GENERAL NOTES:

The detailed drawings are for illustrative purpose and depicts the current version of the F shape concrete barrier. If new movable concrete barriers are requested on a project, they will be constructed according to the F shape movable concrete barrier details on standard plate 628.10.

Each movable concrete barrier section weighs 5030 ± pounds.

Each movable concrete barrier section is detailed to provide end "A" to end "B" connection by insertion of a pin through steel loops.

The Jersey shape or any version of the F shape traffic control movable concrete barriers may be used on a project, however, only the same type or version will be used for each run of barriers.

Movable concrete barrier sections will be placed to provide uniform bearing of the sections with the paved surface as approved by the Engineer.

Movable concrete barrier sections will never be moved or lifted using the end loops.

Movable concrete barrier sections that have been damaged will not be used. Barrier sections are considered damaged if the loops are end welded onto existing damaged loops, loops are fractured, or there is exposed rebar from fractured concrete.

All cost for transporting the barriers from the specified location to the project site, installing, and returning the barriers to the specified location will be incidental to the contract unit price per each for "Traffic Control Movable Concrete Barrier".

If the concrete barriers need to be moved and reset on the project, requiring the barriers to be transported by truck, all cost for removing, transporting, and resetting the barriers will be incidental to the contract unit price per each for "Remove and Reset Traffic Control Movable Concrete Barrier". All cost for small shifts in alignment of the barriers, not requiring the barriers to be transported by truck, will be incidental to various contract items.

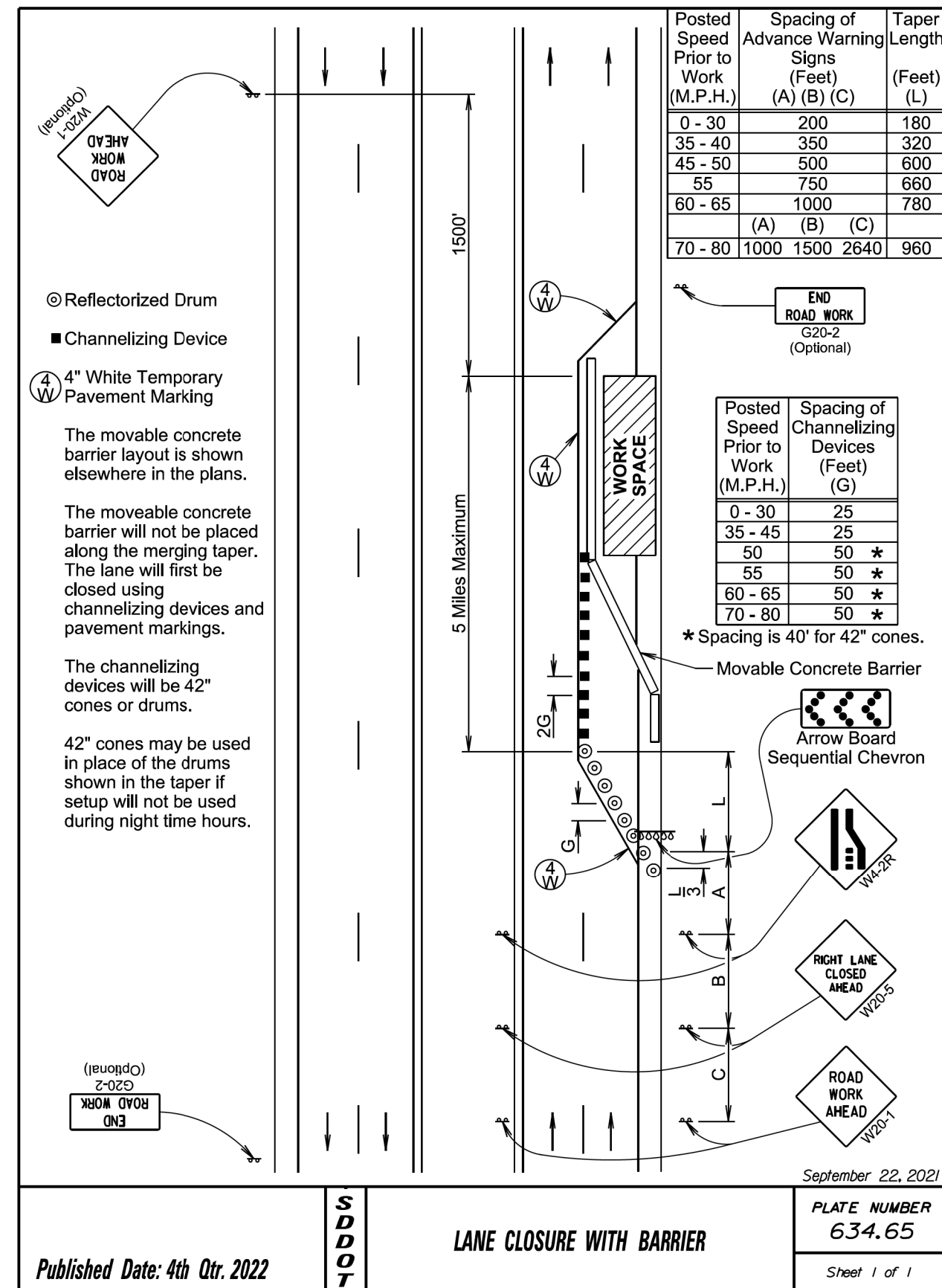
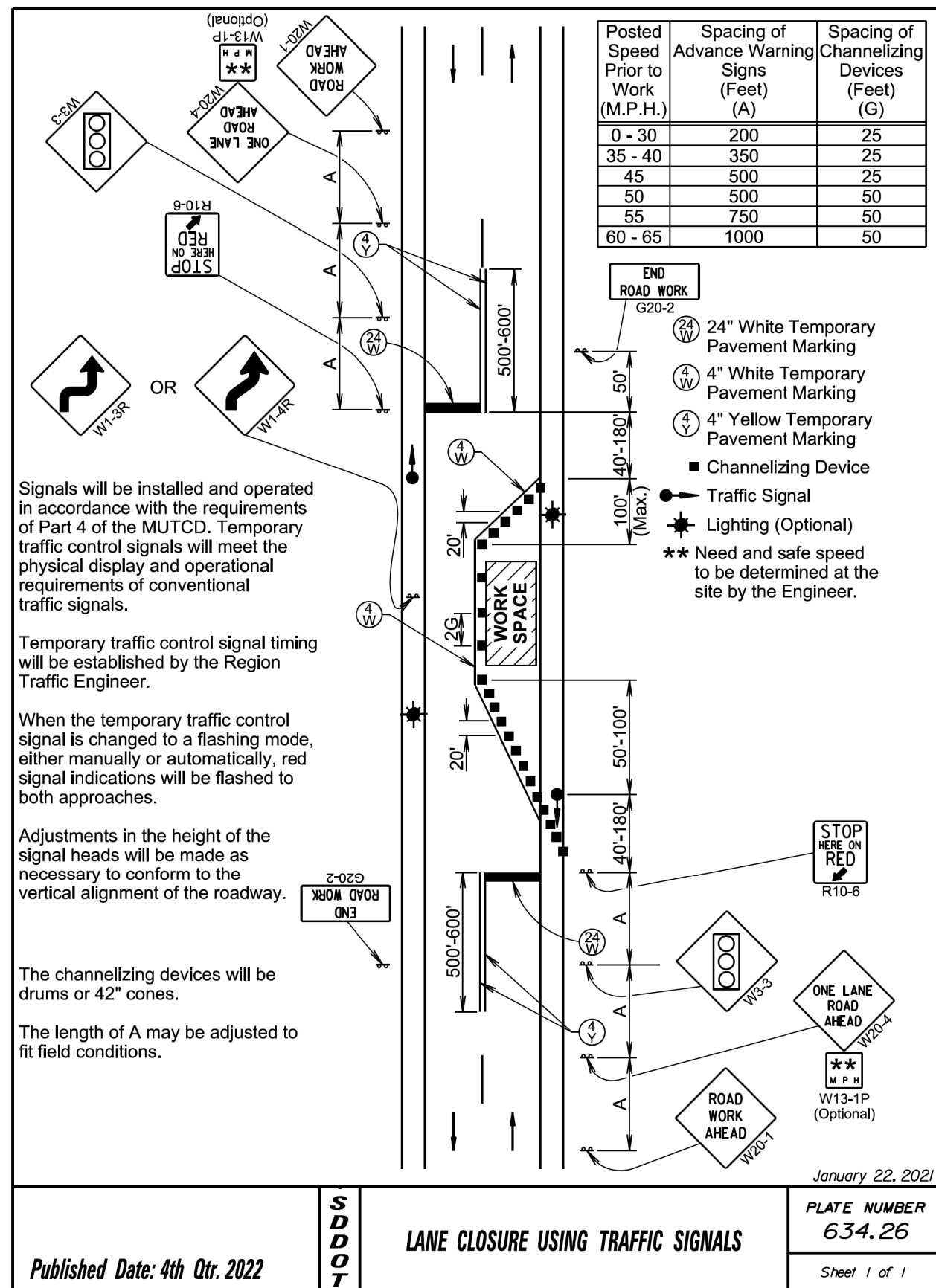
September 14, 2018

Published Date: 4th Qtr. 2022	S D D O T	TRAFFIC CONTROL MOVABLE CONCRETE BARRIERS (F SHAPE INTERIOR SECTION)	PLATE NUMBER 628.01
			Sheet 2 of 2

File - ...16WT TRAFFIC CONTROL.dgn

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	43	48

Plotting Date: 01/04/2021



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	44	48

Plotting Date: 01/04/2021

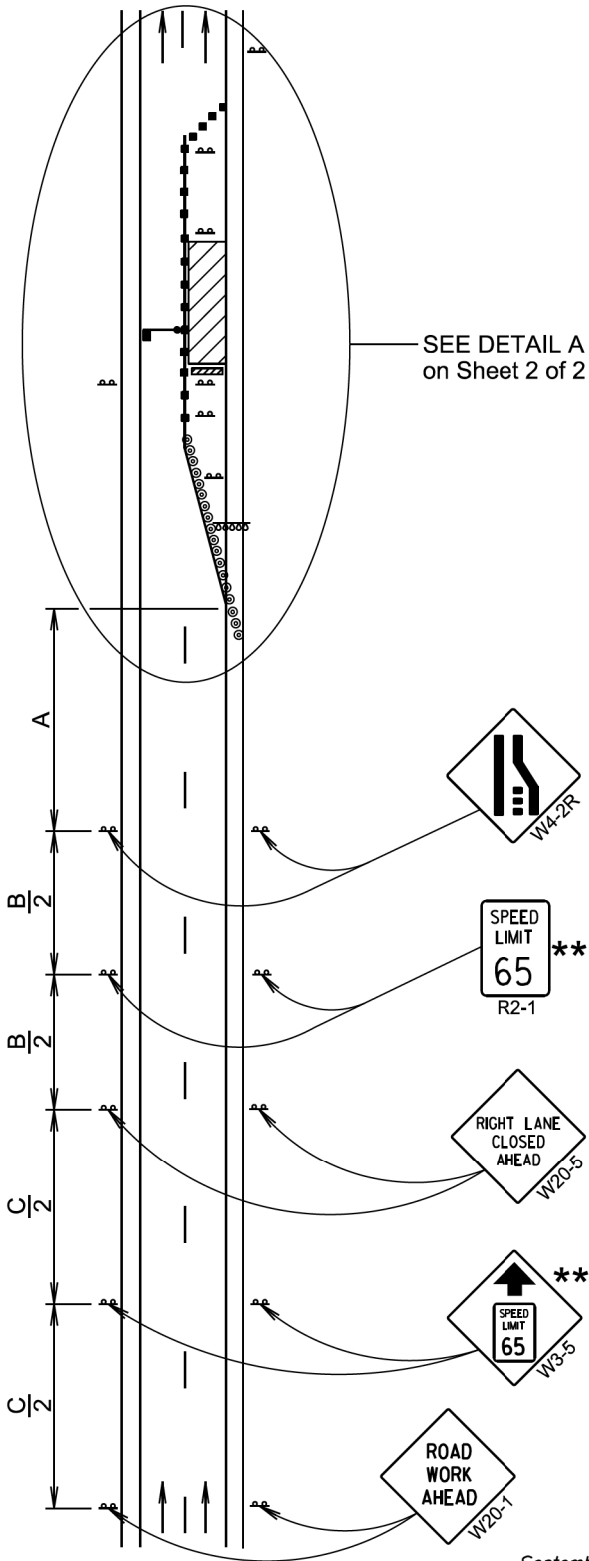
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)		
0 - 30	200		
35 - 40	350		
45 - 50	500		
55	750		
60 - 65	1000		
	(A)	(B)	(C)
70 - 80	1000	1500	2640

** Speed appropriate for location.

- ◉ Reflectorized Drum
- Channelizing Device

ROAD WORK AHEAD sign is only required in advance of the first lane closure.

High speed is defined as having a posted speed limit greater than 45 mph.



September 22, 2021

Published Date: 4th Qtr. 2022	S D D O T	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
			Sheet 1 of 2

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (Feet) (L)
0 - 30	25	180
35 - 40	25	320
45	25	600
50	50 *	600
55	50 *	660
60 - 65	50 *	780
70 - 80	50 *	960

* Spacing is 40' for 42" cones.

** Speed appropriate for location.

*** Use speed limit designated for the condition when workers are present in the work space. Signs will be covered or removed when workers are not present.

■ Flagger (As Necessary)

- ◉ Reflectorized Drum
- Channelizing Device

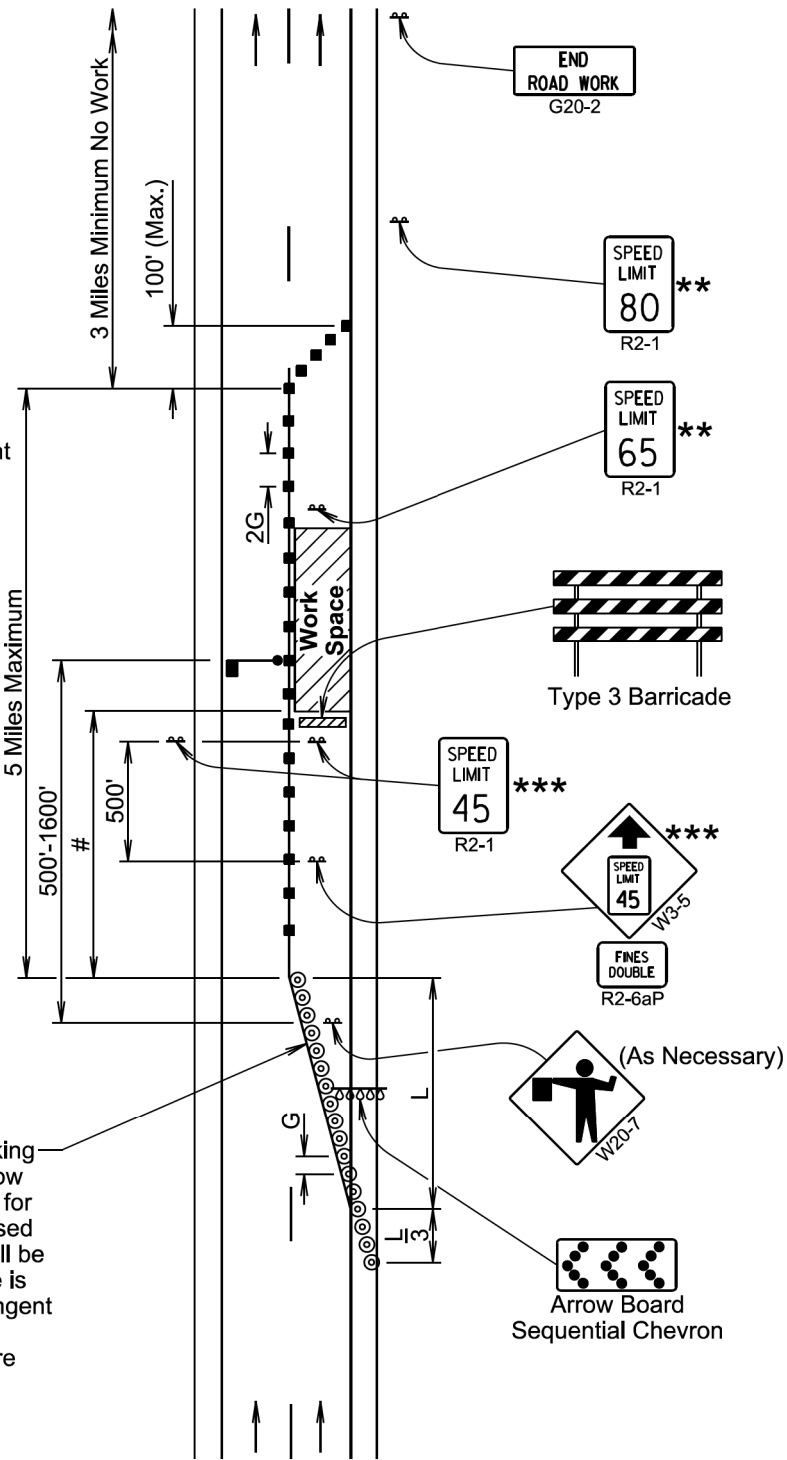
The Work Space will be a minimum of 500' from the end of the taper.

The FLAGGER sign will be used whenever there is a Flagger present.

The channelizing devices will be 42" cones or drums.

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

4" white temporary pavement marking tape for right lane closures, 4" yellow temporary pavement marking tape for left lane closures, or temporary raised pavement markers at 5' spacing will be installed in the taper when the lane is closed overnight, and along the tangent section where the skip lines do not exist and the lane is closed for more than 3 days.



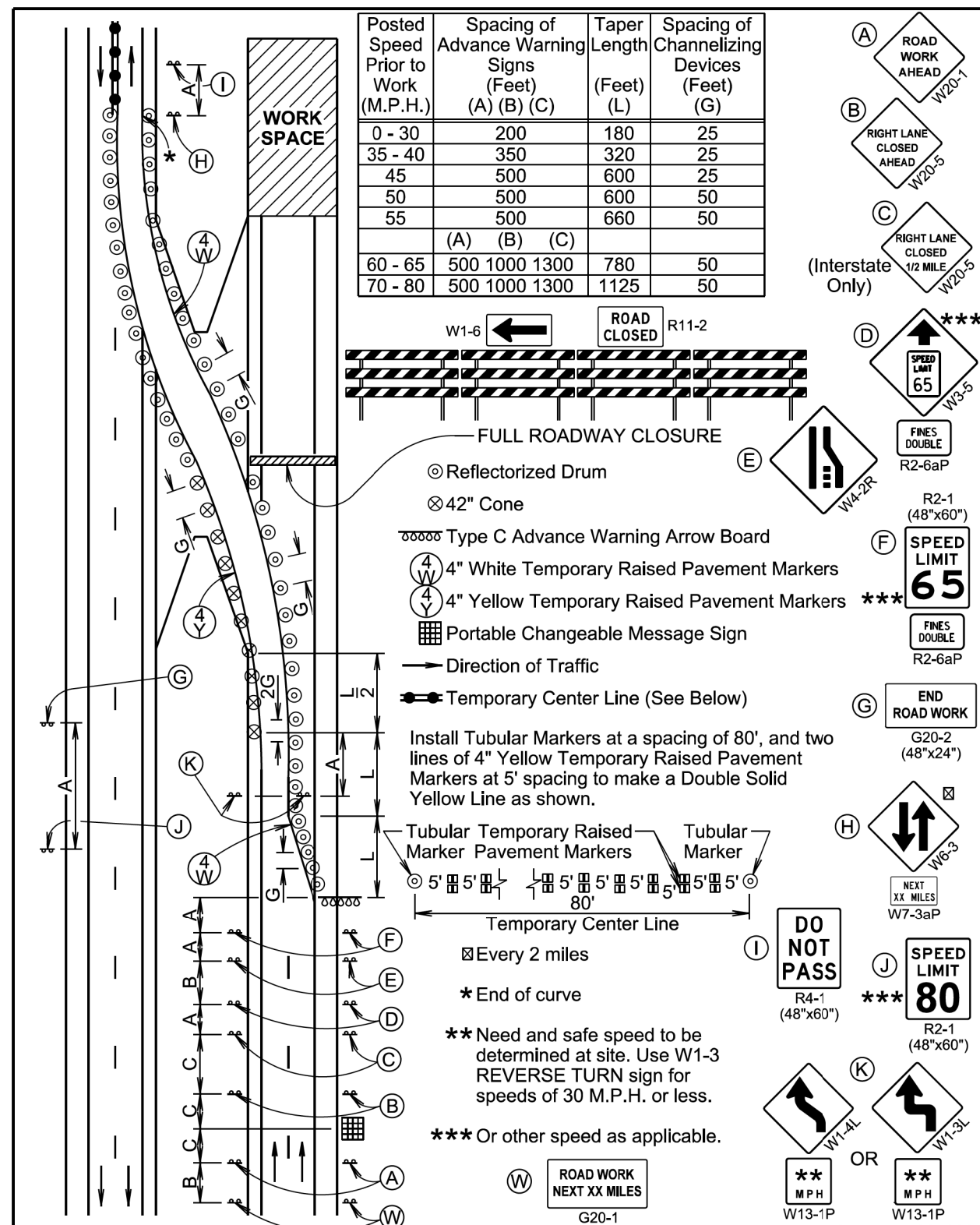
DETAIL A

September 22, 2021

Published Date: 4th Qtr. 2022	S D D O T	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
			Sheet 2 of 2

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	45	48

Plotting Date: 01/04/2021



September 22, 2021

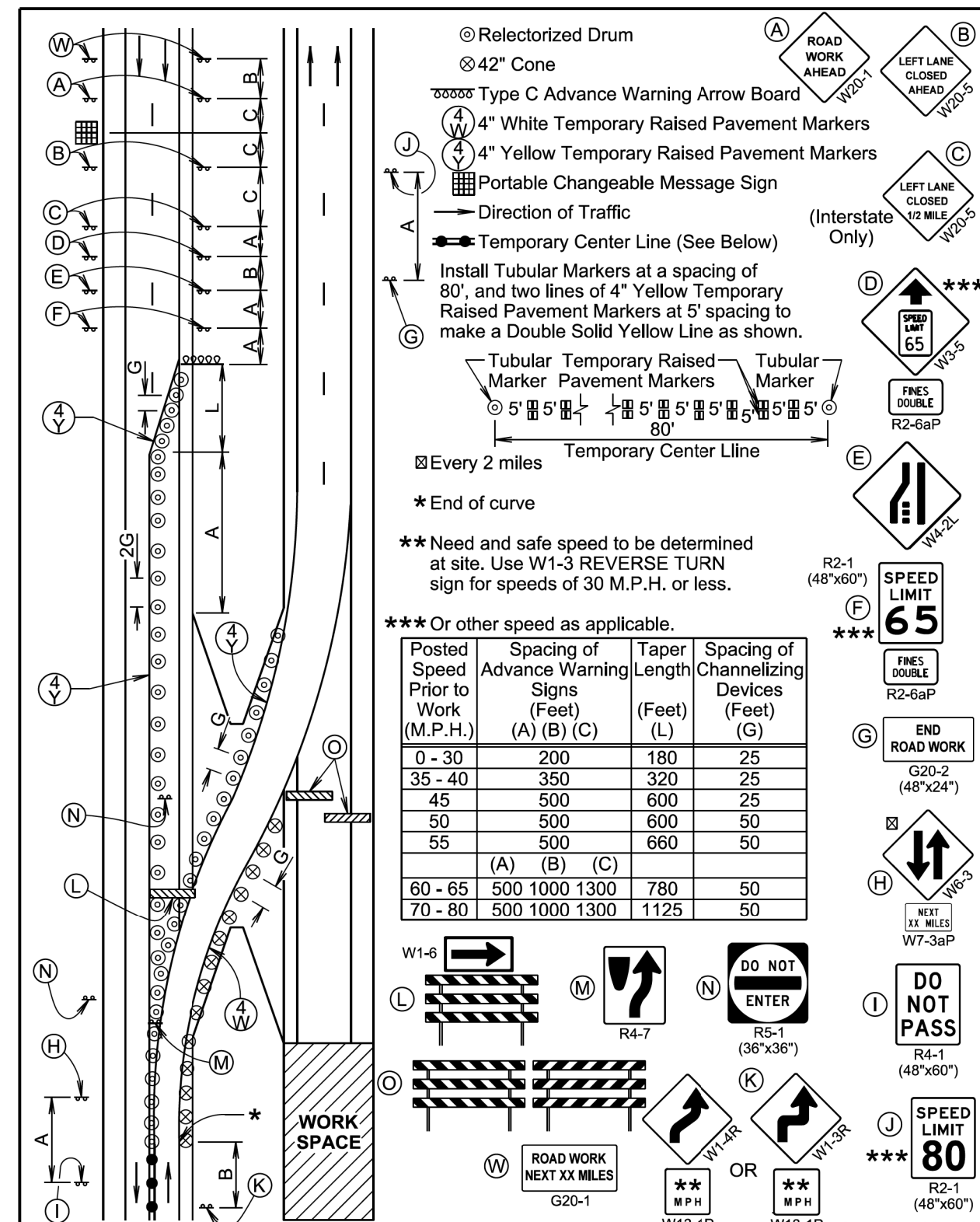
Published Date: 4th Qtr. 2022

SDDOT

MEDIAN CROSSOVER ON DIVIDED HIGHWAY

PLATE NUMBER
634.66

Sheet 1 of 2



September 22, 2021

Published Date: 4th Qtr. 2022

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MEDIAN CROSSOVER ON DIVIDED HIGHWAY

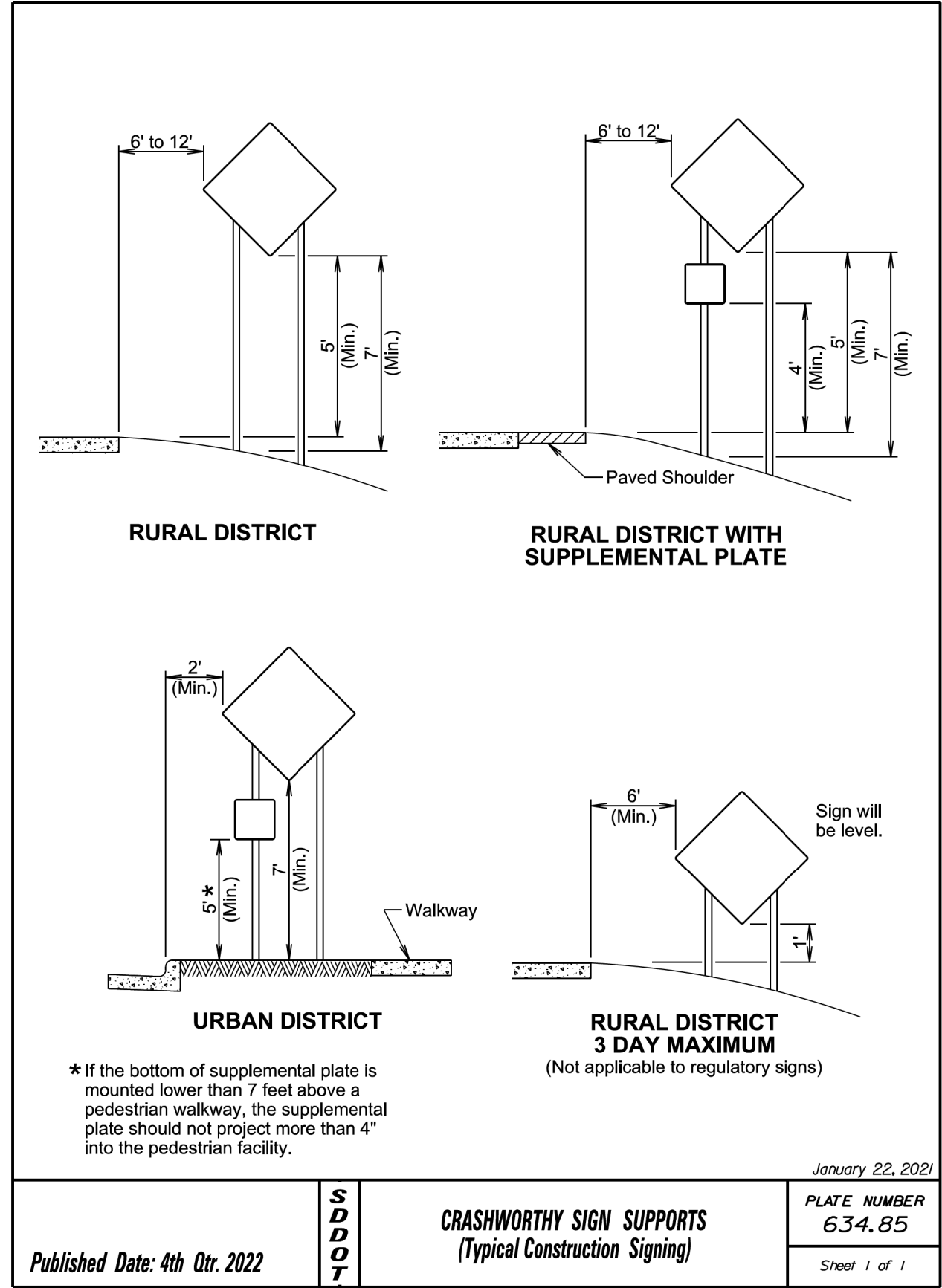
PLATE NUMBER
634.66

Sheet 2 of 2

Plot Scale - 1:0.0131274

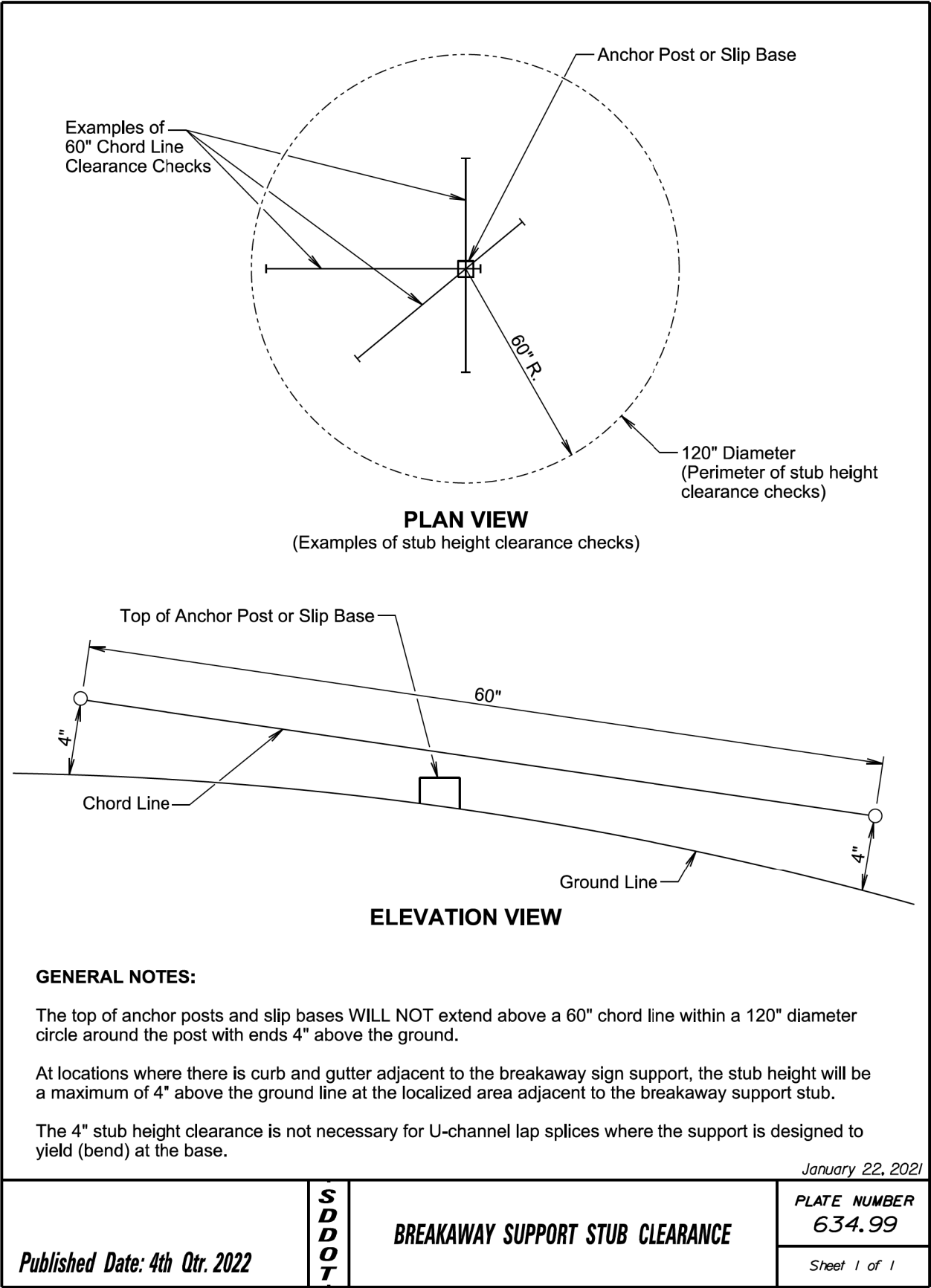
TRSE12114

-Plotted From-



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	46	48

Plotting Date: 01/04/2021

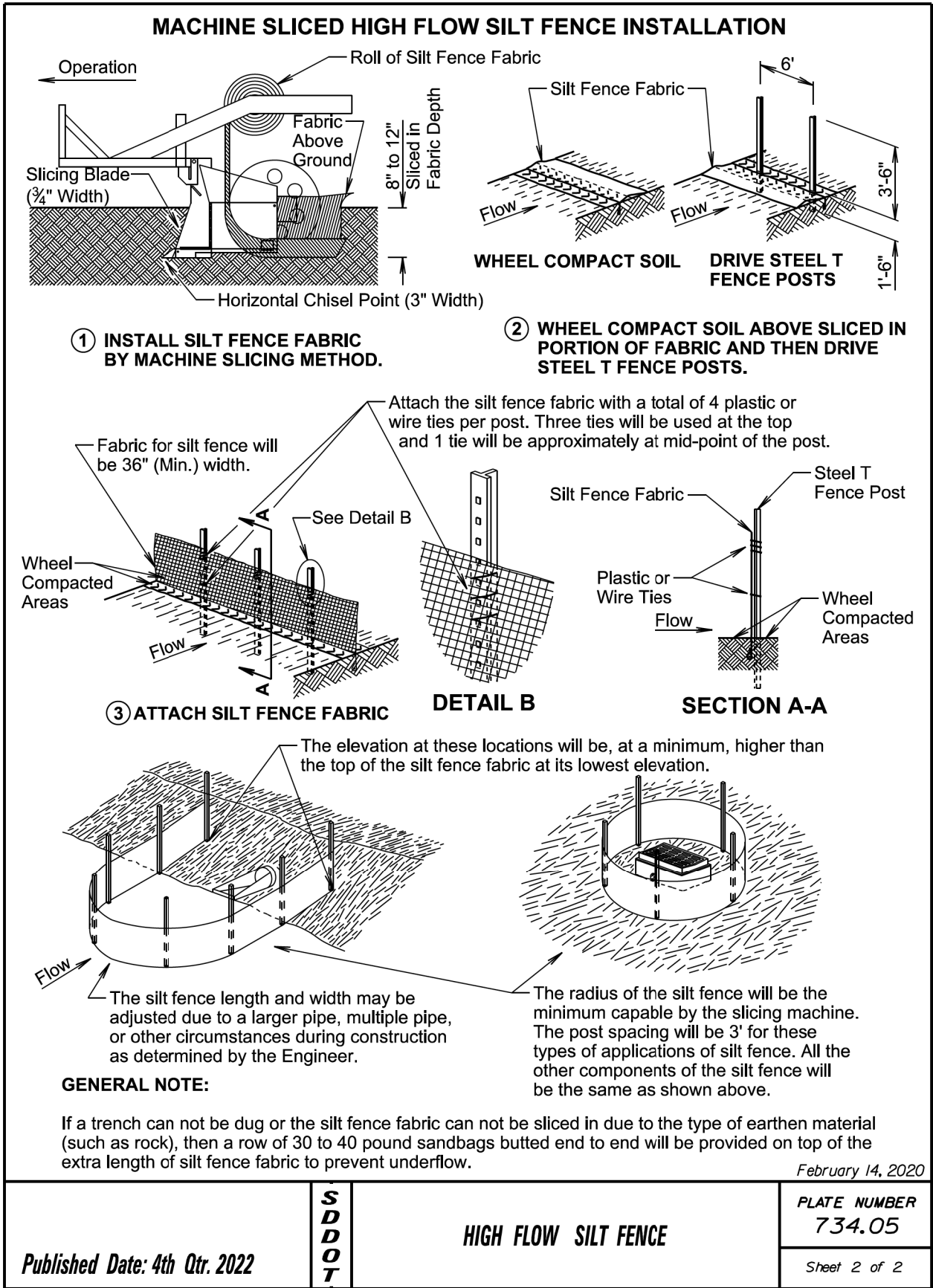
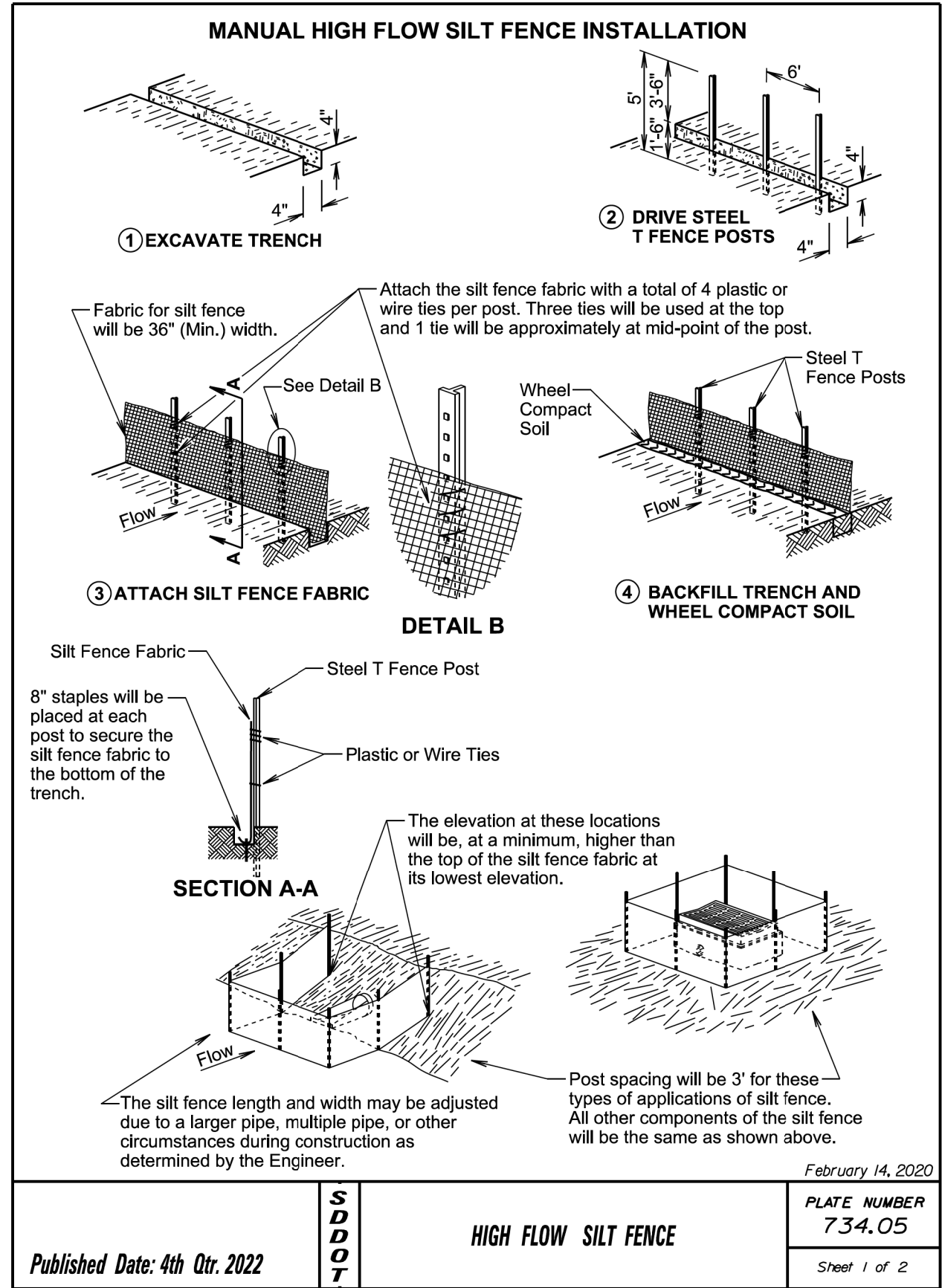


File - ...16WT TRAFFIC CONTROL.dgn

Plot Scale - 1:0.0131274

TRSE12114

-Plotted From-



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	47	48

Plotting Date: 01/04/2021

File - ...16WTF TRAFFIC CONTROL.dgn

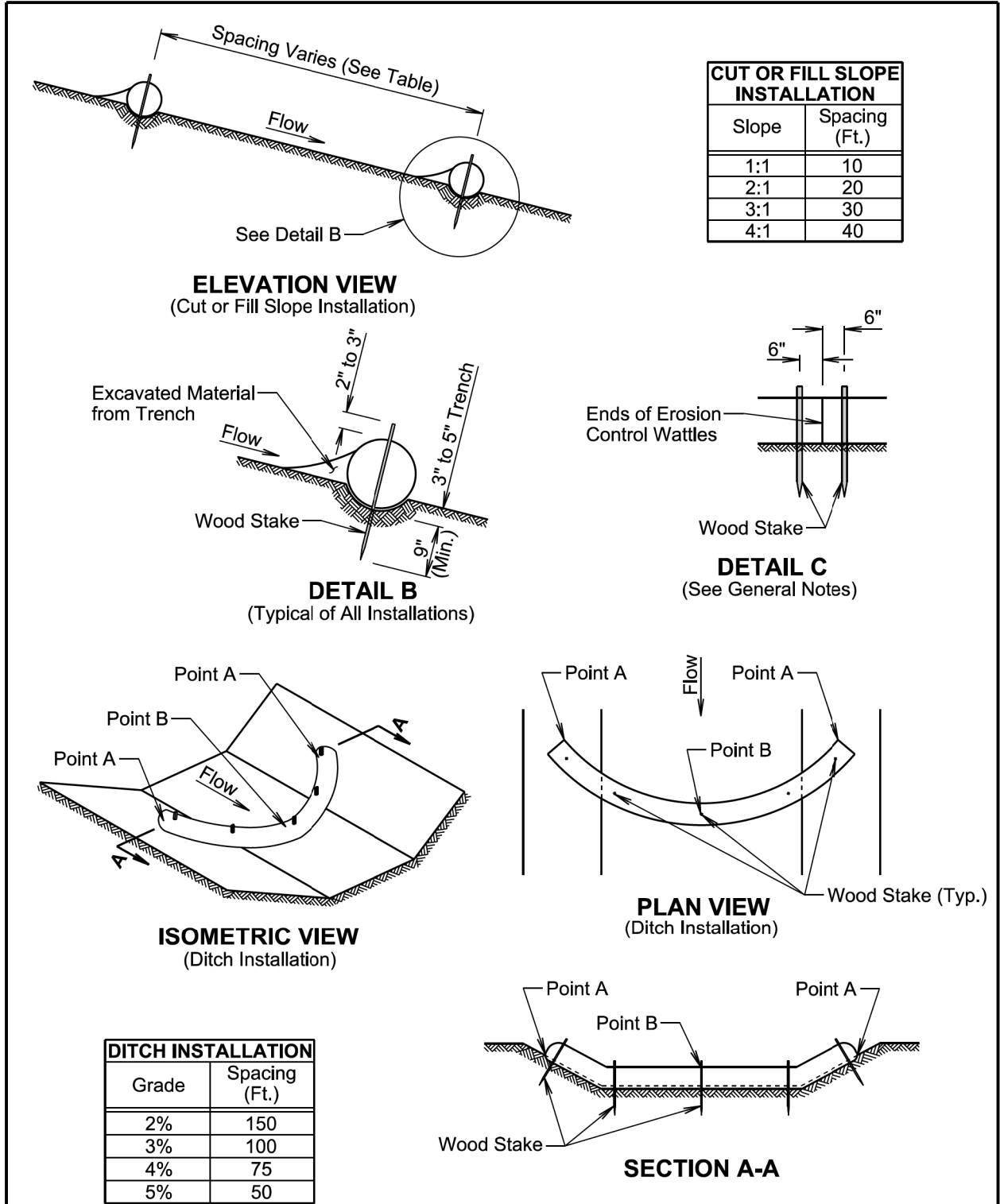
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TRSE12114

-Plotted From-

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 E-288	48	48

Plotting Date: 01/04/2021



February 14, 2020

Published Date: 4th Qtr. 2022	S D D O T	EROSION CONTROL WATTLE	PLATE NUMBER 734.06
			Sheet 1 of 2

GENERAL NOTES:

At cut or fill slope installations, wattles will be installed along the contour and perpendicular to the water flow.

At ditch installations, point A must be higher than point B to ensure that water flows over the wattle and not around the ends.

The Contractor will dig a 3" to 5" trench, install the wattle tightly in the trench so that daylight can not be seen under the wattle, and then compact the soil excavated from the trench against the wattle on the uphill side. See Detail B.

The stakes will be 1"x2" or 2"x2" wood stakes, however, other types of stakes such as rebar may be used only if approved by the Engineer. The stakes will be placed 6" from the ends of the wattles and the spacing of the stakes along the wattles will be 3' to 4'.

Where installing running lengths of wattles, the Contractor will butt the second wattle tightly against the first and will not overlap the ends. See Detail C.

The Contractor and Engineer will inspect the erosion control wattles in accordance with the storm water permit. The Contractor will remove, dispose, or reshape the accumulated sediment when necessary as determined by the Engineer.

Sediment removal, disposal, or necessary shaping will be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping will be incidental to the contract unit price per cubic yard for "Remove Sediment".

All costs for furnishing and installing the erosion control wattles including labor, equipment, and materials will be incidental to the contract unit price per foot for the corresponding erosion control wattle contract item.

All costs for removing the erosion control wattle from the project including labor, equipment, and materials will be incidental to the contract unit price per foot for "Remove Erosion Control Wattle".

February 14, 2020

Published Date: 4th Qtr. 2022	S D D O T	EROSION CONTROL WATTLE	PLATE NUMBER 734.06
			Sheet 2 of 2

File - ...16WT TRAFFIC CONTROL.dgn